JOURNAL

OF

THE PROCEEDINGS

OF

THE LINNEAN SOCIETY.

SUPPLEMENT TO VOL. V.—BOTANY.

FLORULA ADENENSIS.

A SYSTEMATIC ACCOUNT, WITH DESCRIPTIONS, OF THE FLOWERING PLANTS HITHERTO FOUND AT ADEN.

By THOMAS ANDERSON, Esq., M.D., F.L.S.,
H.M.'s Bengal Medical Service.

LONDON:
LONGMAN, GREEN, LONGMANS AND ROBERTS,
AND
WILLIAMS AND NORGATE.
1860.

PRINTED BY TAYLOR AND FRANCIS,
RED LION COURT, FLEET STREET.

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Florula Adenensis. A systematic Account, with Descriptions, of the Flowering Plants hitherto found at Aden. By THOMAS ANDERSON, Esq., M.D., F.L.S., H.M.'s Bengal Medical Service.

[Read November 1, 1860.]

MUCH attention has of late years been directed to the military station of Aden, owing to its rapidly increasing importance, both in a political and commercial point of view; and now that it is visited weekly by the large steamers in their course to India, China, and Australia, its name has become as familiar as that of any of our Eastern settlements. From its commanding position at the entrance to the Red Sea, and from its forming an indispensable link in the chain of communication with our Eastern Empire, the importance of the settlement will increase with the development of our Indian possessions.

Besides the interest attaching to Aden as an isolated stronghold of Britain, and as the probable starting-point whence European civilization will spread over the rich territory of Arabia Felix, its physical peculiarities have always attracted considerable attention; and the anomalous appearance of its rugged, barren pinnacles of rock leaves an indelible impression on the memory of its numerous visitors, while a closer examination of its narrow valleys, and of the steep cliffs that almost encircle them, discloses a strange, though scanty, assemblage of plants and insects. Indeed, so striking is its flora, that the Arabs, the original possessors of Aden, ages ago appropriated to the rock the Arabic name of its most peculiar and beautiful flower*.

Since Salt, who visited Aden in 1809, and probably collected a few plants there, several botanists, on their way to more productive regions, have spent a few hours in exploring its more accessible gorges during the detention of the steamer for a supply of coals. In 1846 M. P. Edgeworth, Esq., of the Bengal Civil Service, a gentleman well known by his valuable memoirs on Indian Botany and his long-continued labours in the cause of that science in India, collected 42 species within a very circumscribed area; the result of which limited botanical excursion was communicated to the Asiatic Society of Bengal in 1847. The insurmountable difficulties attending the identification of such obscure species as those composing the Aden flora, without having access to extensive libraries and herbaria, are shown by the alterations I have made in many of the specific names proposed by Mr. Edgeworth; while at the same time his valuable suggestions and accurate descriptions prove his extensive knowledge of genera and species. Fortunately for our knowledge of the flora, Dr. J. D. Hooker, on his route to India in 1847, remained two days at Aden, and made a most extensive and nearly complete collection of its plants.

On his return to England in 1851, with the assistance of Dr. T. Thomson, his fellow-traveller, he largely increased the number of specimens of his previous collection, and also added some species to the list. Lieut.-Colonel Madden and Sir Robert Schomburgk have also contributed a few species from Aden among their general collections sent to Sir W. Hooker. While detained at Aden on my return from India in May 1859, I was enabled to make two short excursions nearly to the centre of the peninsula, and, considering the limited character of the flora, I secured an extensive set of specimens of nearly all its species. I was so fortunate as to find most in a good state for identification; the result of a copious fall of rain which had occurred about three weeks before my visit, and which had brought most of the plants into flower, and imparted a slight tint of green to many of the least sterile valleys. From these materials the present Florula has been compiled.

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* "Aden" is the Arabic name of that beautiful and remarkable shrub the *Adenium obesum* (*Nerium obesum*, Forsk.). The European residents consider the species as quite peculiar to Aden; but this is an error, as it is found on some of the rocky promontories along the coast of the Red Sea. The name *Adenium*, adopted by Roemer and Schultz for this and another species (*A. Hongel*), is merely the Arabic name Latinized.

Most of the plants have required a careful comparison with a large suite of specimens from various localities, and the consultation of a formidable array of works on Indian and Arabian botany, in order to determine their synonymy and geographical distribution.

These labours have been greatly lightened by daily reference to Sir William Hooker's unrivalled herbarium and rich library; of both of which I have been permitted to make unrestricted use. Without repeated examinations of the East Indian Herbarium, and of the Arabian, Abyssinian, and Egyptian collections of Sieber, Delile, Aucher-Eloy, Schimper, and other travellers, in all of which the Kew Herbarium is peculiarly rich, the work could not have been accomplished. To Dr. Hooker I am indebted for hourly advice and assistance; while his entire Aden collections have been placed at my disposal for examination and description. Without this privilege the Florula could not have been commenced, as his collections considerably exceeded my own in number of species, and they thus form the basis of the Flora. To G. Bentham, Esq. I have to acknowledge my obligations for assistance in the determination of several specimens of *Leguminosæ*, *Scrophularineæ*, and *Lavandula*; as well as for the free use of his Herbarium.

Before proceeding to the purely descriptive matter, it appears desirable to notice, 1st, the physical aspect and climate of Aden; 2nd, a few of the peculiarities of its flora; 3rd, some facts in the geographical distribution of the species; and finally, to institute a comparison between its flora and those of one or two similarly situated localities.

1. Aden is a small rocky peninsula, in many features resembling our other stronghold, Gibraltar; and is situated on the southern coast of Arabia, in 12° 47′ N. lat., and 45° 10′ E. long. The maritime region called Tehama, of which it is a promontory, is a sandy, barren tract from 20 to 100 miles in breadth, extending along the shore of the Red Sea, from a point a little east of Aden to the Gulf of Akaba. A mountainous region of 4–7000 feet in elevation rises immediately beyond; this, from its height, attracts a considerable portion of the moisture borne from the Indian Ocean by the north-west monsoon, and thus, enjoying a climate favourable to the growth of luxuriant cereals and fruits, it has for ages been called the Happy Arabia. It forms a striking contrast to the sterile Tehama, in the southern portion of which rain but rarely

falls, while towards its northern extremity it is quite unknown. The few streams that enter from the mountains of Arabia Felix are speedily lost in its arid sands ; cultivation is therefore confined to the vicinity of the few towns and villages, and is dependent on a precarious supply of water from wells. The area of the Aden peninsula is about fifteen miles, its greatest breadth being five miles and its least three. It is connected with the Arabian coast by a narrow sandy isthmus, covered at high spring-tides; but formerly it was probably an island, since the whole district is of recent origin, being evidently a raised sea-beach; as is shown by the remains, twenty-three miles inland, of the ancient seaport of Mooza, formerly frequented by the Phœnicians. The peninsula is entirely composed of volcanic rocks of apparently great age, forming numerous precipitous peaks and narrow ridges, which on the southern and eastern sides rise from the sea in inaccessible cliffs, attaining their greatest elevation, 1775 feet, in the peak "Jibeel Shumshum." On the eastern side and towards the isthmus is a considerable depression, the crater of the volcano, surrounded on nearly all sides by high walls of rock and cinder. From the serrated ridge Jibeel Shumshum, numerous narrow valleys, shut in by precipices, radiate on all sides towards the sea, in which some end abruptly, while on the northern side others widen out into the limited sea-beach.

The only patches of vegetation occur at the base of these gorges, just above the sea-line; and the loose and tolerably fertile soil accumulated there consists of scoriæ mixed with sand and the detritus washed from the rocks above by the violent torrents which rush down every ravine after the rare but heavy falls of rain. Along the cliffs utter sterility reigns, except where a ledge of rock or a mass of cinder has allowed the accumulation of sufficient earth to afford sustenance to a few straggling bushes of *Capparis galeata* or *Adenium obesum.*

In so low a latitude the sun shines with intense force nearly throughout the year, and at Aden the solar power is increased by every peculiarity of physical conformation and climate. The undisturbed atmosphere stagnates in the walled-in valleys, where a death-like stillness always reigns. The black and naked rocks absorb by day the scorching rays transmitted through an ever-cloudless sky, only to radiate the pent-up heat by night, thus confining to the shore the cool but feeble breezes that occasionally spring up from the Indian Ocean. Accordingly, even in December, when the sun's power is at its lowest, Dr. Hooker found the temperature of the soil at 107° Fahr. a few feet below the surface. In the hotter seasons of the year, the sun, even in the early morning, is overpowering, and above the rocks the air flickers from the intense heat; while all distant objects are distorted by an imperfect mirage. Almost perpetual drought is, of necessity, the concomitant of such a climate as I have described, and accordingly the annual rain-fall at Aden never exceeds 6 or 7 inches; this scanty amount being spread over the period between October and the end of April; while occasionally none falls for a year and a half. Still Aden is not considered unhealthy, even to Europeans, who seem to become soon accustomed to the heat; and so great is our power of adaptation to circumstances, that after a residence of a year or two the climate is spoken of as cool and pleasant from October to the end of March, and as bearable during the remainder of the year.

2. The vegetation of Aden closely resembles that of Arabia Petræa, of which it is evidently the southern extension. It is eminently of a desert character; the species being few in number (only 94), and being quite disproportioned to the number of genera and Natural Orders; even when the flora is compared with those of localities having similar areas, and similar relations to the mainland. Most of the species are limited in the number of individuals, a few only of the more arid forms predominating. *Dipterygium glaucum*, six or seven species of *Capparidaceæ*, *Reseda amblyocarpa*, *Cassia pubescens* and *obovata*, *Acacia eburnea* and a few *Euphorbiaceæ* are the only common plants; and some of these are so plentiful, that in many places they abound to the exclusion of all other plants. The other species are either very local, or sparingly scattered over the peninsula.

All the species are more or less peculiar in their habit, and some are so strange in their appearance as to constitute the anomalies of the Natural Orders to which they belong. As examples may be enumerated:—*Sphærocoma Hookeri* among *Caryophyllaceæ*, *Adenium obesum*, with its almost globular fleshy trunk, naked branchlets bearing a tuft of leaves and an umbel of beautiful flowers, *Moringa aptera*, in which the leaves are reduced to long subrigid raches, the prickly *Jatropha spinosa*, and, strangest of all, the *Æluropus Arabicus*, a grass with short spiny leaves, so sharp, that it was with the greatest difficulty I could procure specimens of it. The bright-green colour, which forms so pleasing a feature of the vegetation of the temperate and moist tropical regions of the globe, is quite unknown at Aden. Here foliage is reduced to a minimum, and the superfluous moisture given off by leaves in less arid climates is stored up in fleshy stems against seasons of long-continued drought. With the exception of some *Capparidaceæ* and *Reseda amblyocarpa*, all the plants have either glaucous whitened stems and leaves, or are completely covered with a hoary pubescence.

Aridity, while reducing the amount of cellular tissue, has also favoured the production of spines; and though in many cases the development has not attained actual spinosity, still in rigid or distorted branches and asperities of stem and leaf bears witness to the modifying influence of the climate. Of the ninety-four species that constitute the flora, sixteen bear sharp thorns on some part of their structure. In some the leaves terminate in sharp, recurved hooks; in others the stipules are spinous; in a few the bracts are prickly, and in *Lycium europæum* and *Euphorbia cuneata*, the short stiff branches are terminated by short thorns. Several species yield gums or resinous matter, and their stems frequently become encrusted by these exudations, probably caused by the bark cracking from exposure to the great heat of the sun. I have observed resinous substances accumulated in various quantities on *Balsamodendron opabolsamum*, *Acacia Edgeworthii*, *Adenium obesum*, and the shrubby *Euphorbiæ*. All the *Capparidaceæ* (with the exception of *Mærua Thomsoni*), *Dipterygium glaucum*, *Reseda amblyocarpa*, the *Compositæ*, and a few others, are characterized by more or less pungency or aromatic odour,—qualities always possessed by plants of desert regions.

The small proportion of species to the number of genera and Natural Orders will be perceived by an examination of the accompanying Table :—

	Genera.	Species.
Cruciferæ	3	3
Capparidaceæ......	4	9
Resedaceæ	1	1
Polygalaceæ	1	1
Caryophyllaceæ	2	2
Malvaceæ	2	3
Sterculiaceæ	1	1
Tiliaceæ	2	2
Geraniaceæ........	1	1
Zygophyllaceæ	2	2
Rhamnaceæ	1	1
Terebinthaceæ	1	1
Moringeæ	1	1
Leguminosæ	8	11
Cucurbitaceæ........	2	2
Portulacaceæ	2	2
Umbelliferæ	1	1
Rubiaceæ	1	1
Compositæ..........	5	5
Apocyneæ	1	1
Asclepiadaceæ	2	2
Convolvulaceæ	2	3
Boragineæ	1	1
Solanaceæ	1	1

	Genera.	Species.
Scrophularineæ	4	4
Acanthaceæ	1	1
Verbenaceæ	1	1
Labiatæ	1	1
Plumbagineæ	1	1
Salvadoraceæ	1	1
Phytolaccaceæ	1	1
Salsolaceæ	1	1
Amarantaceæ	2	2

	Genera.	Species.
Paronychiaceæ	1	1
Nyctagineæ	1	2
Euphorbiaceæ	3	7
Urticaceæ	1	1
Gnetaceæ	1	1
Amaryllideæ	1	1
Cyperaceæ	1	1
Gramineæ	9	9

Total number of natural orders, 41; of genera, 79; of species, 94.

This aggregation, within so considerable an area, of almost solitary representatives of genera, is probably a feature peculiar to isolated desert localities. It first attracted my attention during my visit to Aden in 1859, and I have since drawn up tables of the species, genera, and natural orders of the Floras of Hong-Kong, Ischia, and Gibraltar; the results of which confirm my first impression. Hong-Kong and Ischia are nearly equal to Aden in area, and, though differing from it in being detached from the mainland, the sea has proved a less insurmountable barrier to the introduction of species from the neighbouring countries than the unpropitious climate of Aden, and the inaccessible walls of rock by which it is cut off from the rest of Arabia. Gibraltar, though of smaller extent than Aden, yet possesses so many features in common with it, as fully to justify a comparison of their floras. I am indebted to Mr. Bentham for the materials from which the Table of the Hong-Kong species is deduced. That of the flora of Ischia is taken from Gussone's elaborate Florula of that island*, all the cultivated and doubtful species and genera having been carefully rejected. Kelaart's 'Flora Calpensis' is the authority for the list of species of Gibraltar.

Table showing the proportion of Natural Orders, Genera, and Species in the Floras of Aden, Hong-Kong, Ischia, and Gibraltar.

	Natural Orders.	Genera.	Species.
Aden	1	1·92	2·29
Hong-Kong	1	4·59	7·90
Ischia	1	4·32	9·23
Gibraltar	1	3·50	6·70

The actual paucity of species in the vegetation of Aden, though indicated by this Table, will be more distinctly seen by a reference to the numbers from which the proportions were obtained.

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* 'Enumeratio Plantarum Vascularum Inarimensium.'

	Natural Orders.	Genera.	Species.
Aden	41	79	94
Hong-Kong	122	560	965
Ischia	86	372	794
Gibraltar	68	243	456

These tables show that the great preponderance of natural orders and genera, relatively to the number of species, is not necessarily a distinguishing mark of the vegetation of similar localities; since it is not the result of situation or isolation, but is entirely due to climatic causes. In regions favourable to vegetation, as in Hong-Kong, Ischia, and Gibraltar, the balance is preserved by a constant struggle for existence going on between the species. At Aden, however, no such struggle takes place; but all the species have to strive against conditions tending to the entire extinction of vegetable life. Viewed in this light, the Flora appears a collection of desert species, selected from widely different natural orders and genera, and all alike contending with the excessive heat and drought.

Before noticing some facts in the geographical distribution of the species, I have only to advert to the unequal proportion borne by monocotyledonous to dicotyledonous plants. But eleven out of the ninety-four species are monocotyledons, of which nine are grasses. Of the remaining two, one is an exceedingly rare plant at Aden (*Pancratium tortuosum*), of which I found a solitary clump. The entire absence of Palms and *Polygonaceæ* seems also worthy of record. In so dry a climate Ferns and other Cryptogamia, with the exception of Lichens, are quite unknown.

3. The geographical distribution of even so small a number of species possesses several points of interest, particularly when regarded with reference to the extension of the Arabic Flora over the arid regions of the earth. Of the ninety-four species composing the Florula, fourteen, or a little less than a sixth, are endemic, and one constitutes a new genus, confined to Aden. They are as follows:—

Cleome paradoxa, *R. Br.*
—— pruinosa, *T. Anders.*
Mærua Thomsoni, *T. Anders.*
Sphærocoma Hookeri, *T. Anders.*
Hibiscus Welshii, *T. Anders.*
Sterculia Arabica, *T. Anders.*
Tavernieria glauca, *Edgew.*
Acacia Edgeworthii, *T. Anders.*
Ptychotis Arabica, *T. Anders.*
Convolvulus sericophyllus, *T. Anders.*
Anarrhinum pedicellatum, *T. Anders.*
Campylanthus junceus, *Edgew.*
Lavandula setifera, *T. Anders.*
Euphorbia systyla, *Edgew.*

The remaining eighty species have an extensive geographical distribution, fourteen occurring over all the barren parts of the globe. The following Table shows how they spread east and west from Arabia as their centre:—

Table of Distribution of Aden Plants.

	Species.		Species.
Arabia	68	North-west India ...	21
Scinde	44	Persia	19
Egypt	29	Senegal	19
Abyssinia	25	Mediterranean	18

The desert flora, of which these species form a part, attains its greatest breadth in the African desert, about 5° east longitude, where it covers the territory between the 10th and 37th degrees of north latitude. In Asia, though prolonged into Scinde and the western portion of the Punjab, it is diminished in breadth to 7° or 8° of latitude; its southern limit being 23° north latitude in Scinde, and 30° or 31° north latitude in Affghanistan and the Punjab. The limits of this vegetation may be defined as follows:—Starting from its head-quarters, the rainless region of Arabia, the flora extends over the peninsula of Arabia, with the exception of the south-western mountainous district, and along the shores of the Persian Gulf, whence it spreads into Southern Persia. It includes the whole of Beloochistan, South Affghanistan, Scinde, and a part of the Punjab. West from Arabia Petræa the flora passes into Egypt and Nubia, and partially into Abyssinia, and extends over the African desert to Senegal; finding its western limit in the Cape de Verd Islands. Even there it retains many of its most desert types, as is shown by the flora of these islands containing twenty-nine genera common also to Aden and other parts of Arabia, and eleven species absolutely identical: a resemblance the more remarkable from the small number of species composing the Cape de Verd Flora. Webb, in the 'Spicilegia Gorgonica,' enumerates only 235 species of flowering plants, of which the following genera are represented at Aden. Those plants of which the specific name is given are identical in both floras.

Polygala triflora, ***Linn.***
Mollugo.
Abutilon.
Corchorus Antichorus, ***Roem.***
Grewia.
Fagonia cretica, ***Linn.***
Zygophyllum simplex, ***Linn.***
Zizyphus.
Indigofera.
Rhynchosia.
Cassia.
Acacia.
Citrullus colocynthis, ***Schrad.***
Oldenlandia.
Vernonia.
Heliotropium.

Campylanthus.
Lavandula.
Statice.
Ærua Javanica.
Boerhaavia scandens, ***Linn.***
Euphorbia.
Forskohlea.
Cyperus.
Tricholæna Teneriffæ, ***Parlat.***
Panicum viride, ***Linn.***
Pennisetum cenchroides, ***Rich.***
Aristida Adscensionis, ***Linn.***
Eragrostis ciliaris, ***Link.***

[Read 21st June 1860.]

CONSPECTUS GENERUM FLORULÆ ADENENSIS.

Classis I. *DICOTYLEDONES.*

Subclassis I. **Thalamifloræ.**

Ordo I. CRUCIFERÆ.

Tribus I. Alyssineæ. *Silicula bivalvis, septo lato.*

1. Farsetia, *Turra.* *Calyx* clausus. *Stamina* tetradynama; filamentis edentulis. *Silicula* lineari-oblonga; valvis planis; septo venoso uninervio. *Semina* plura, marginata.

Tribus II. Isatideæ. *Silicula indehiscens.*

2. Dipterygium, *Decaisne.* *Corollæ* petala integra. *Stamina* tetradynama; filamentis edentulis. *Silicula* latere compressa, crustacea, dorso utrinque alata, unilocularis, monosperma.

Tribus III. Brassiceæ. *Siliqua septo lineari.*

3. Diplotaxis, *DC.* *Calyx* patens. *Stamina* tetradynama. *Siliqua* elongato-linearis, compressa; valvis uninerviis, membranaceis. *Stylus* conicus, brevissimus. *Semina* ovata, biseriata.

Ordo II. CAPPARIDACEÆ.

Tribus I. Cleomeæ. *Fructus capsularis.*

1. Cleome, *Linn.* *Stamina* 4–6, toro subgloboso inserta. *Stylus* brevissimus. *Capsula* siliquæformis, unilocularis, bivalvis; valvis deciduis, a septo seminifero solutis.

Tribus II. Cappareæ. *Fructus baccatus.*

2. Cadaba, *Forsk.* *Sepala* 4, biseriatim valvata. *Corollæ* petala

4 vel nulla. *Stamina* 4–5, apici tori stipiformis inserta. *Appendix* tubulosa, linguæformis, a basi tori exserens. *Ovarium* longe stipitatum. *Bacca* siliquæformis, subtorulosa.

3. Capparis, *Linn.* *Sepala* 4, in æstivatione imbricata. *Corollæ* petala 4. *Stamina* indefinita, toro parvo hemisphærico inserta. *Ovarium* stipitatum. *Bacca* globosa. *Semina* plurima, in pulpa immersa.

4. Mærua, *Forsk.* *Calyx* infundibuliformis; tubo persistente, limbi lobis æstivatione valvatis, deciduis. *Corolla* nulla. *Stamina* plurima. *Bacca* siliquæformis, valde torulosa.

Ordo III. RESEDACEÆ.

1. Reseda, *Linn.* *Calyx* 6-partitus. *Petala* 5. *Stamina* 10–30. *Carpidia* 3. *Capsula* obovata, apice hians.

Ordo IV. POLYGALACEÆ.

1. Polygala, *Linn.* *Sepala* 5, duo lateralia (alis) latiora, petaloidea. *Corolla* irregularis, petala inferiore carinata. *Stamina* 8, monadelpha. *Capsula* membranacea, obovata, compressa, monosperma.

Ordo V. CARYOPHYLLACEÆ.

1. Mollugo, *Linn.* *Calyx* 5-partitus. *Petala* nulla. *Stamina* 5. *Stigmata* 3, linearia. *Capsula* trilocularis, obtuse trigona, loculicide trivalvis. *Semina* plurima.

2. Sphærocoma, *T. Anders.* *Calyx* 5-partitus, persistens. *Petala* 5, subhypogyna. *Stamina* 5. *Ovarium* uniloculare, biovulatum. *Stylus* solitarius; stigmate bifido. *Utriculus* chartaceus, abortu monospermus.

Ordo VI. MALVACEÆ.

Tribus I. Hibisceæ. *Calyx involucello cinctus.*

1. Hibiscus, *Linn.* *Involucellum* 5–10-phyllum. *Calyx* 5-fidus. *Petala* 5, in æstivatione convoluta. *Tubus stamineus* columnæformis. *Ovarium* sessile, 5-loculare. *Semina* lanata vel sericea.

Tribus II. SIDEÆ. *Calyx involucello nullo, nudus.*

2. ABUTILON, *Gärtn.* *Involucellum* nullum. *Ovarium* 8–10-loculare. *Cocca* trisperma.

Ordo VII. STERCULIACEÆ.

1. STERCULIA, *Linn.* *Flores* unisexuales. *Calyx* coloratus, campanulatus. *Corolla* nulla. *Tubus stamineus* solidus, apice 10-lobatus. *Ovarium* stipitatum, carpellis 5. *Follicula* 4. *Semina* pauca.

Ordo VIII. TILIACEÆ.

1. CORCHORUS, *Linn.* *Sepala* 4, decidua. *Petala* 4, unguiculata. *Stamina* 8–10. *Capsula* quadrilocularis, quadrivalvis, polysperma.

2. GREWIA, *Linn.* *Calyx* pentaphyllus. *Corollæ* petala 5, basi intus glandula vel foveola nectarifera instructa. *Stamina* plurima, apici stipitis brevis inserta. *Ovarium* quadriloculare. *Drupa* quadriloba, tetrapyrena.

Ordo IX. GERANIACEÆ.

1. ERODIUM, *L'Hér.* *Calyx* 5-partitus. *Petala* 5, caduca. *Stamina* 10, monadelpha, biseriata; 5 fertilia, 5 ananthera vel obsoleta, basi glandulis instructa. *Styli* 5, gynophoro longitudinaliter adnati. *Carpella* 5, abortu monosperma; stylis a gynophoro elastice et spiraliter solutis.

Ordo X. ZYGOPHYLLACEÆ.

1. FAGONIA, *Tourn.* *Calyx* 5-partitus, deciduus. *Petala* 5, calyce longiora. *Stamina* 5, æqualia. *Capsula* pyramidalis, pentagona, pentacocca.

2. ZYGOPHYLLUM, *Linn.* *Calyx* 5-partitus, deciduus. *Petala* 5, emarginata, calyce paulo longiora. *Stamina* 10, corolla breviora; filamentis subulatis, flexuosis; antheris ovatis. *Capsula* ovata, pentagona, 5-locularis.

Subclassis II. **Calycifloræ.**

Ordo XI. RHAMNACEÆ.

1. ZIZYPHUS, *Tourn.* *Calyx* patens, 5-fidus. *Petala* 5, calycis

fauci inserta. *Discus* planus. *Stamina* 5, petalis opposita. *Ovarium* biloculare, in disco immersum. *Ovula* solitaria, erecta. *Styli* 2. *Fructus* carnosus. *Semina* erecta, compressa.

Ordo XII. TEREBINTHACEÆ.

1. BALSAMODENDRON, *Kunth.* *Flores* polygami. *Calyx* 4-dentatus, persistens. *Petala* 4, sub toro inserta, æstivatione valvatim induplicata. *Stamina* 8, cum petalis inserta. *Ovarium* biloculare. *Ovula* in loculis gemina. *Drupa* abortu sæpissime unilocularis, monosperma.

Ordo XIII. MORINGEÆ.

1. MORINGA, *Juss.* *Calyx* 5-partitus. *Petala* 5, duo longiora, æstivatione imbricata. *Stamina* 8–10, disco cupuliformi inserta; filamentis basi liberis, supra medium connatis, apice distinctis. *Ovarium* uniloculare; placentis parietalibus 3. *Fructus* leguminiformis, rostratus, torulosus, trivalvatus; valvis dissepimenta transversa gerentibus. *Semina* uniseriata, trigona.

Ordo XIV. LEGUMINOSÆ.

Subordo PAPILIONACEÆ.

Tribus I. LOTEÆ.

† Subtribus *Genisteæ.*

1. ARGYROLOBIUM, *Eck et Zey.* *Calyx* bilabiatus; labio superiore bi-, inferiore tridentato. *Vexillum* semiorbiculatum; *alæ* oblongæ; *carina* obtusa. *Stamina* monadelpha. *Legumen* lineari-ensiforme, subcompressum, utrinque acutum, stylo apiculatum, 6–10-spermum. *Flores* flavi.

†† Subtribus *Indigoferæ.*

2. INDIGOFERA, *Linn.* *Calyx* urceolato-campanulatus, 5-fidus. *Vexillum* subrotundatum, reflexum; *alæ* oblongæ, carinam æquantes; *carina* obtusa, gibba, basi utrinque calcarata. *Stamina* diadelpha. *Legumen* teretiusculum, oblongum, falcatum, 2–5-spermum. *Flores* coccinei.

††† Subtribus *Galegeæ.*

3. POGONOSTIGMA, *Boiss.* *Calyx* ebracteolatus, subæqualiter 5-

dentatus. *Vexillum* suborbiculatum, carinam alasque superans; *alæ* basi cum carina connexæ; *carina* acuta, incurva. *Stylus* incurvus; stigmate capitato, longe barbato. *Ovarium* biovulatum. *Legumen* ovatum, compressum, monospermum. *Flores* purpurei.

4. TEPHROSIA, *Pers.* *Calyx* ebracteolatus, subcampanulatus, 5-fidus, laciniis superioribus profundius fissis. *Vexillum* suborbiculatum, carinam et alas paulo superans. *Stamina* 10, monadelpha. *Stigma* pubescens. *Legumen* lineare, compressum, rectum. *Semina* 5–12, compressa.

Tribus II. VICIEÆ.

Subtribus *Hedysareæ.*

5. TAVERNIERA, *DC.* *Calyx* bibracteolatus. *Vexillum* subovatum; *alæ* calyce breviores; *carina* obtusa, vexillum æquans. *Stamina* 10, diadelpha. *Stylus* longus, flexuosus, filiformis. *Legumen* biarticulatum; articulis compressis, monospermis. *Flores* rosei.

Tribus III. PHASEOLEÆ.

Subtribus *Rhynchosieæ.*

6. RHYNCHOSIA, *Lour.* *Calyx* bilabiatus; labio superiore bifido, inferiore trifido. *Vexillum* obovatum, alas liberas superans; *carina* falcata, rostrata. *Stamina* 10, diadelpha. *Legumen* membranaceum, compressum, falcatum, dispermum. *Semina* lævia, notata. *Flores* flavi.

Subordo CÆSALPINEÆ.

Tribus CASSIEÆ.

7. CASSIA, *Linn.* *Calyx* pentaphyllus, deciduus. *Petala* 5, unguiculata, inæqualia. *Stamina* 10, inæqualia; filamentis liberis. *Legumen* compressum; septis transversis. *Semina* compressa, verticalia.

Subordo MIMOSEÆ.

Tribus ACACIEÆ.

8. ACACIA, *Neck.* *Flores* polygami, hermaphroditi et masculi.

Corolla tubulosa aut campanulata, limbo 5-fido. *Stamina* numerosa, exserta; filamentis liberis. *Legumen* crassum, pulpa farctum, aut coriaceum, membranaceum, indehiscens vel vix dehiscens.

Ordo XV. CUCURBITACEÆ.

1. Cucumis, *Linn.* *Flores* monoici. Masc. *Calyx* campanulatus, 5-dentatus. *Stamina* 5, triadelpha, calyci inserta; antherarum loculis linearibus, infra apicem connectivi crassiusculi simplicis adnatis. Fem. *Calycis* tubus subglobosus; limbo 5-dentato. *Pepo* carnosus, sulcatus, verrucosus.

2. Citrullus, *Neck.* *Flores* monoici. Masc. *Calyx* profunde 5-fidus. *Stamina* 5, triadelpha, imæ corollæ inserta; antheris unilocularibus, loculo lineari, connectivi marginem dorsalem gyrose adnato. Fem. *Calycis* tubus globosus; limbo profunde 5-fido. *Pepo* globosus, lævis, carne solida.

Ordo XVI. PORTULACEÆ.

1. Trianthema, *Linn.* *Calyx* bracteolatus; tubo cum ovario connato; limbo 5-partito, intus colorato. *Corolla* nulla. *Stamina* 5. *Ovarium* uniloculare. *Stigma* abortu unicum, excentricum. *Capsula* subcylindrica, apice truncata, disperma, parte superiore circumscisse dissiliente. *Semina* subreniformia, rugosa.

2. Orygia, *Forsk.* *Calyx* 5-partitus, persistens. *Petala* plurima, ovali-oblonga, integerrima, tenerrima, calyce breviora. *Stamina* plurima, calyci inserta, partim cohærentia. *Ovarium* liberum, 5-loculare. *Stigmata* 5 *Capsula* chartacea, quinquevalvis. *Semina* plurima, reniformia, atra.

Ordo XVII. UMBELLIFERÆ.

1. Ptychotis, *Koch.* *Involucrum* oligophyllum. *Calycis limbus* 5-dentatus. *Petala* emarginata, bifida, cum lacinula inflexa. *Fructus* latere compressus, muricatus. *Mericarpia* 5-juga.

Ordo XVIII. RUBIACEÆ.

1. Oldenlandia, *Linn.* *Calycis* limbus 4-dentatus, dentibus in fructu erectis. *Corolla* tubulosa; limbo subrotato. *Capsula* subglobosa, apice rimula loculicide operta. *Semina* plurima.

Ordo XIX. COMPOSITÆ.

Subordo TUBULIFLORÆ. *Flores hermaphroditi. Corolla regularis.*

Tribus I. VERNONIACEÆ. *Capitula multiflora, homogama, discoidea. Antheræ ecaudatæ. Flores cyano-purpurei.*

1. VERNONIA, *Schreb.* *Involucrum* imbricatum, floribus brevius. *Receptaculum* nudum. *Corollæ* limbus 5-fidus. *Achenia* callo basilari cartilagineo. *Pappus* biserialis; series exterior paleacea; interior aristæformis, multo longior.

Tribus II. ASTEROIDEÆ. *Capitula multiflora, homogama. Antheræ basi caudatæ. Flores lutei.*

2. VARTHEMIA, *DC.* *Involucrum* imbricatum, squamis adpressis acutis. *Receptaculum* alveolatum. *Corolla* tubulosa. *Achenia* oblonga, compressa, pubescentia. *Pappus* biserialis.
3. IPHIONA, *DC.* *Involucrum* imbricatum; squamis adpressis, acuminatis, mucronatis. *Receptaculum* alveolatum. *Corollæ* tubus nullus. *Achenia* subcylindrica, sulcata, sparse hispida. *Pappus* rigidus, multiserialis; setis intimis corollam æquantibus.
4. HOCHSTETTERIA, *DC.* *Involucri* squamæ pluriseriales, subæquales, lineari-lanceolatæ. *Receptaculum* hirsutum. *Corolla* tubulosa. *Achenia* subturbinata, villosa; villis achenium superantibus. *Pappus* uniserialis; setis 10, dense ciliatis.

Subordo LIGULIFLORÆ. *Flores hermaphroditi, ligulati. Capitula pauciflora. Flores lutei.*

5. BRACHYRAMPHUS, *DC.* *Involucrum* imbricatum; squamis acuminatis, margine scariosis. *Receptaculum* nudum. *Corolla* ligulata. *Achenia* oblonga, muricata, breviter rostrata. *Pappus* pluriserialis, pilosus, mollis, albus.

Subclassis III. **Corollifloræ.**

Ordo XX. APOCYNEÆ.

1. ADENIUM, *Rœm. et Sch.* *Calyx* 5-partitus. *Corolla* subinfundibuliformis, pubescens, intus lineis 5, villosis longitudi-

naliter notata. *Stamina* 5, brevissima, inclusa. *Antheræ* cum stigmate cohærentes. *Ovaria* 2, globosa. *Stylus* superne incrassatus; stigmate bidentato. *Succus* lacteus.

Ordo XXI. ASCLEPIADACEÆ.

1. Steinheilia, *Decaisne*. *Calyx* 5-partitus. *Corolla* campanulata, 5-fida; lobis acutis, erectis, contortis; fauce squamulis 5, flavidis, clausa; tubo basi foveolis 5, squamulis alternantibus. *Antheræ* membrana oblonga, stigmati incumbente, terminatæ. *Pollinia* pendula, subcompressa, clavata. *Stigma* muticum.

2. Glossonema, *Decaisne*. *Calyx* 5-partitus. *Corolla* subcampanulata, profunde 5-fida; lobis erectis paginaque superiore tuberculo carnoso instructis. *Pollinia* ovoidea, ad apicem funiculo geniculato affixa. *Stigma* 5-gonum. *Folliculus* ovoideus, spinis innocuis echinatus.

Ordo XXII. CONVOLVULACEÆ.

1. Convolvulus, *Linn*. *Calyx* pentaphyllus. *Corolla* campanulato-infundibuliformis; limbo 5-plicato. *Stamina* 5, imo corollæ tubo inserta, inclusa. *Ovarium* biloculare; loculis biovulatis. *Stylus* unicus; stigmatibus 2. *Capsula* bilocularis, bivalvis. *Semina* 4.

2. Cressa, *Linn*. *Calyx* pentaphyllus. *Corolla* infundibuliformis; limbo 5-partito, lobis planis. *Stamina* 5, exserta. *Ovarium* biloculare; loculis biovulatis. *Styli* 2. *Capsula* abortu monosperma.

Ordo XXIII. BORAGINEÆ.

1. Heliotropium, *Tourn*. *Calyx* 5-partitus. *Corolla* hypocraterimorpha; fauce nuda; limbo 5-fido. *Stamina* 5, corollæ tubo inserta. *Ovarium* quadriloculare; loculis uniovulatis. *Stylus* terminalis; stigmate peltato.

Ordo XXIV. SOLANACEÆ.

1. Lycium, *Linn*. *Calyx* urceolatus, 5-dentatus. *Corolla* infundibuliformis, tubulosa; limbo 5-fido, erecto. *Stamina* 5, medio corollæ inserta, inclusa. *Ovarium* biloculare. *Stylus* simplex; stigmate capitato, obsolete bilobo. *Bacca* subglo-

bosa, calyce persistente suffulta, bilocularis. *Semina* plurima, reniformia.

Ordo XXV. SCROPHULARINEÆ.

1. Anarrhinum, *Desf.* *Calyx* profunde 5-partitus. *Corolla* tubulosa; tubo incurvo, basi non calcarato; fauce pervia; limbo bilabiato. *Stamina* 4, didynama, cum rudimento quinti sterilis. *Antheræ* reniformes, uniloculares. *Capsula* bilocularis, chartacea, polysperma; loculis sub apice poro dehiscentibus.
2. Anticharis, *Endl.* *Calyx* 5-partitus. *Corolla* tubulosa; fauce elongata, ampla; limbo 5-fido. *Stamina* 2, antica, inclusa. *Capsula* ovata, subrostrata, bisulca, loculicide bivalvis; valvulis demum fissis. *Columna* placentifera integra.
3. Lindenbergia, *Lehm.* *Calyx* campanulatus, semifidus. *Corolla* bilabiata; labio superiore erecto, inferiore trilobo, palato biplicato. *Stamina* 4, fertilia; antherarum loculis disjunctis. *Capsula* ovoidea, bisulca, loculicide bivalvis; valvulis integris. *Columna* placentifera 4-partibilis.
4. Campylanthus, *Roth.* *Calyx* 5-partitus. *Corollæ* tubus elongatus, incurvus; limbo patente, subæquali. *Stamina* 2, inclusa; antherarum loculis mucronatis. *Capsula* bilocularis, ovato-compressa, septicide dehiscens.

Ordo XXVI. ACANTHACEÆ.

1. Blepharis, *Pers.* *Calyx* 5-partitus, inæqualis; lacinia infera bidentata. *Corolla* unilabiata; labio 5-fido; fauce cartilaginea. *Stamina* 4; antheris unilocularibus, margine ciliato-barbatis; filamentis inferis supra antheras prolongatis. *Capsula* 4-sperma. *Semina* testa floccosa. *Spicæ* spinosæ, imbricato-bracteatæ.

Ordo XXVII. VERBENACEÆ.

2. Bouchea, *Cham.* *Calyx* tubulosus, plicatus. *Corolla* infundibulari-hypocraterimorpha; limbo oblique sub-bilabiato. *Stamina* 4, didynama, inclusa; antherarum loculis oppositis. *Capsula* dicocca, calyce inclusa; coccis elongatis, unilocularibus, multistriatis.

Ordo XXVIII. LABIATÆ.

1. Lavandula, *Tourn.* *Calyx* ovato-tubulosus, subæqualiter 5-dentatus, 15-nervius. *Corollæ* tubus exsertus; limbo oblique bilabiato. *Stamina* 4, tubo corollæ inclusa, declinata; filamentis glabris, liberis. *Nuculæ* 4, glabræ. *Flores* in spicis nudis terminalibus.

Ordo XXIX. PLUMBAGINEÆ.

1. Statice, *Willd.* *Calyx* scariosus, 5-costatus. *Corolla* ima basi tantum gamopetala. *Stamina* 5, petalis opposita. *Styli* 5, staminibus alterni; stigmatibus filiformibus, cylindricis. *Utriculus* unilocularis, monospermus, membranaceus, indehiscens.

Ordo XXX. SALVADORACEÆ.

1. Salvadora, *Linn.* *Sepala* 4, parva. *Corolla* membranacea, 4-partita. *Stamina* 4, perigyna, corollæ lobis alterna; antheris introrsis, bilocularibus. *Stigma* sessile, simplex. *Bacca* monosperma. *Semen* erectum.

Subclassis IV. **Monochlamydeæ.**

Ordo XXXI. PHYTOLACCEÆ.

1. Limeum, *Linn.* *Calyx* profunde 5-partitus, herbaceus, margine membranaceus, laciniis subæqualibus. *Petala* distincta 3–5. *Stamina* 6–7, petalis alterna, disco perigyno inserta; antheris versatilibus. *Ovarium* biloculare. *Styli* 2. *Capsula* dicocca. *Cocci* monospermi, compressi, tuberculati.

Ordo XXXII. SALSOLACEÆ.

1. Traganum, *Del.* *Calyx* 5-fidus, demum crasso-induratus, laciniis apteris. *Corolla* nulla. *Stamina* 5, toro inserta. *Filamenta* crassa. *Torus* (nectarium) inter stamina et pistillum, carnosus, obtuse 5-gonus. *Styli* 2, subulato-filiformes. *Utriculus* depressus, monospermus, indehiscens, calyce reconditus. *Caulis* articulatus. *Folia* succulenta.

Ordo XXXIII. AMARANTACEÆ.

1. Ærva, *Forsk.* *Flores* tribracteati, laterales, abortivi nulli. *Perigonium* pentaphyllum, lanatum. *Stamina* 5, basi in cupu-

lam connata. *Antheræ* introrsæ, biloculares. *Staminodia* 5, dentata. *Stylus* subsessilis; stigma bifidum. *Utriculus* evalvis, monospermus.

2. SALTIA, *R. Br.* *Flores* tribracteati, abortivi 1–2. *Perigonium* (calyx) pentaphyllum. *Stamina* 5; filamentis subulatis compressis, basi in cupulam connatis. *Stylus* simplex; stigmate capitato globoso. *Ovarium* uniovulatum.

Ordo XXXIV. PARONYCHIACEÆ.

1. COMETES, *Burm.* *Flores* ternati. *Bracteæ* demum plumoso-pinnatifidæ. *Calyx* herbaceus, 5-partitus; segmentis spinoso-mucronatis. *Corolla* nulla. *Stamina* 5; filamentis subulatis, basi in cupulam subhypogynam connatis. *Staminodia* (petala) 5, linearia, staminibus alternis. *Utriculus* membranaceus, monospermus, indehiscens. *Semen* erectum.

Ordo XXXV. NYCTAGINEÆ.

1. BOERHAAVIA, *Linn.* *Perigonium* coloratum, tubulosum; limbo plicato, deciduo. *Stamina* 3, subinclusa vel exserta. *Ovarium* uniloculare, uniovulatum. *Stylus* simplex; stigma obtusum. *Fructus* (achenium) perigonii tubo inclusus, angulato-costatus. *Semen* erectum; testa cum endocarpio connata.

Ordo XXXVI. EUPHORBIACEÆ.

1. EUPHORBIA, *Linn.* *Flores* monoici, involucro communi dentato inclusi. *Calyx* et *corolla* nulla. MASC. plures, stamine unico, filamento articulato glandulaque minuta consistentes. FEM. unicus, centralis, longius stipitatus. *Ovarium* triloculare. *Styli* tres, distincti vel plus minus coaliti, bifidi. *Capsula* tricocca; coccis monospermis.

2. CROZOPHORA, *Neck.* *Flores* monoici. MASC. *Calyx* 5-partitus, æstivatione valvatus. *Petala* 5, æstivatione convoluta. *Stamina* 8–10; filamentis basi coalitis; antheris extrorsis. FEM. *Calyx* 10-partitus. *Corolla* nulla. *Ovarium* sessile. *Styli* 3, bifidi. *Capsula* tricocca; coccis monospermis.

3. JATROPHA, *Linn.* *Flores* monoici. MASC. *Calyx* 5-partitus; segmentis æstivatione convolutis. *Petala* 5, æstivatione convoluta, cum glandulis 5 alternantia. *Stamina* 8; antheris introrsis. FEM. *Calyx* et corolla nulla. *Ovarium* glandulis

(petalis) cinctum. *Styli* 3, distineti. *Stigmata* peltata, undulata. *Capsula* tricicocca; coccis monospermis.

Ordo XXXVII. URTICACEÆ.

1. FORSKOHLIA, *Linn.* *Flores* androgyni, in receptaculo lanato involucro communi cincto. MASC. *Perigonium* monophyllum. *Stamen* unicum; filamentum elastice prosiliens; anthera extrorsa. FEM. *Perigonium* ventricosum, lanatum. *Ovarium* uniloculare, uniovulatum. *Stylus* simplex. *Stigma* lineare, unilaterale.

Ordo XXXVIII. GNETACEÆ.

1. EPHEDRA, *Tourn.* *Flores* dioici; bracteis decussatim oppositis. MASC. *Perigonium* membranaceum, tubulosum, apice bivalve. *Stamen* unicum; anthera bilocularis; loculis apice poro dehiscentibus. FEM. *Perigonium* nullum. *Ovarium* apice pervium, uniloculare, uniovulatum. *Drupa* baccata, monosperma.

Classis II. *MONOCOTYLEDONES.*

Ordo XXXIX. AMARYLLIDEÆ.

1. PANCRATIUM, *Linn.* *Perigonium* superum, infundibuliforme, corollinum; tubo elongato; limbo regulariter 6-partito. *Corona* faucis tubulosa, exserta, dentata. *Stamina* 6, 3 sterilia, in coronam faucis connata. *Ovarium* triloculare, multiovulatum.—*Herbæ* scapigeræ; radice bulbosa.

Ordo XL. CYPERACEÆ.

1. CYPERUS, *Linn.* *Spiculæ* multifloræ, compressæ, terminales umbellatæ; involucro communi 3–4-phyllo; glumis distiche imbricatis. *Glumæ* unifloræ. *Aristæ* hypogynæ, ovarii nullæ. *Stamina* 2–3. *Stylus* trifidus.

Ordo XLI. GRAMINEÆ.

Tribus I. PANICEÆ. *Spiculæ bifloræ.*

1. TRICHOLÆNA, *Schrad.* *Spiculæ* bifloræ, laxe paniculatæ. *Gluma* florifera mutica. *Palea* binervia, obtusa. *Lodiculæ* 2, distinctæ. *Stamina* 3. *Styli* 2; stigmata plumosa.

2. PANICUM, *Linn.* *Spiculæ* subbifloræ, dense spicæformes. *Glumæ* exteriores 3, plerunque vacuæ 4–6-nerviæ. *Gluma*

florifera concava, enervis. *Lodiculæ* 2, carnosæ, truncatæ, obtusæ. *Stamina* 3. *Styli* 2.

3. PENNISETUM, *Pal. de Beauv.* *Spiculæ* bifloræ, in spicas cylindricas, densas, aristatas, confertæ. *Gluma* florifera membranacea, concava, mutica, paleam complectens. *Lodiculæ* 2, fere obsoletæ. *Stamina* 3. *Styli* 2, basi paulo connati.

Tribus II. STIPACEÆ. *Spiculæ unifloræ. Gluma florifera aristata. Ovarium stipitatum.*

4. ARISTIDA, *Linn.* *Glumæ* 2, membranaceæ, inæquales. *Gluma* florifera coriacea, teres, involuta, apice aristata; arista trifida. *Palea* membranacea, mutica. *Lodiculæ* 2, integræ. *Stamina* 2. *Styli* 2, distincti.

5. STIPAGROSTIS, *Nees.* *Glumæ* 2, membranaceæ, subæquales. *Gluma* florifera chartacea, membranacea, apice biloba, inter lobos aristata; arista trifida. *Palea* obtusa. *Lodiculæ* 2, spathulato-cochleariformes.

Tribus III. CHLORIDEÆ. *Spiculæ quadrifloræ vel multifloræ. Glumæ et paleæ aristatæ; aristæ tortæ. Ovarium sessile.*

6. TETRAPOGON, *Desf.* *Flores* inferiores 2, hermaphroditi; superiores 2, imperfecti. *Glumæ* 2, carinatæ; superior mutica, inferior aristata. *Gluma* florifera trinervia, carinata, sub apice aristata. *Palea* bicarinata, aristata. *Lodiculæ* 2, integræ.

7. DACTYLOCTENIUM, *Willd.* *Flores* distichi, hermaphroditi. *Glumæ* 2, carinatæ, compressæ; superior aristata, inferiorem complectens. *Gluma* florifera carinata, sub apice mucronata. *Palea* bicarinata. *Lodiculæ* 2, emarginatæ.

Tribus IV. FESTUCEÆ. *Spiculæ multifloræ. Ovarium sessile.*

8. ERAGROSTIS, *Pal. de Beauv.* *Spiculæ* compressæ, paniculatæ. *Gluma* florifera membranacea, trinervia, carinata, decidua. *Palea* bicarinata, persistens; carinis ciliatis. *Caryopsis* libera.

9. ÆLUROPUS, *Trin.* *Spiculæ* compressæ, spicato-racemosæ. *Gluma* florifera coriacea, multinervia, ecarinata, margine membranacea. *Palea* bicarinata.

FLORULA ADENENSIS.

Classis I. DICOTYLEDONES.

Ordo I. CRUCIFERÆ.

1. Farsetia, *Turra.*

1. F. stylosa (*T. Anders.*). Pilis adpressis incana; foliis paucissimis, linearibus, basi attenuatis; sepalis lineari-lanceolatis, margine scariosa, glabra, angusta; siliquis breviter pedunculatis, linearibus, subincanis, stylo apiculatis; stylo 1 lin. longo.—*Mathiola stylosa*, Hochst. et Steud. in Schimper, Pl. Arab. Fel. n. 860.

Hab. Aden, in arenosis (*Hook. fil. et T.*!).

Distr. In deserto Arabiæ Felicis!

Decaisne, in Ann. Sc. Nat. ser. 2. vol. iv. p. 69, describes another species, *F. longisiliqua*, from Yemen, but of which Walpers, in Repert. vol. i. p. 139, says, "Non hujus generis esse videtur." I have not seen this plant. *F. linearis*, Dcne. MSS. in Herb. Mus. and Boiss. in Ann. Sc. Nat. ser. 2. vol. xvii. p. 150, I distinguish from *F. stylosa* by its smaller flowers, ovate-lanceolate sepals, and much longer styles. I have seen specimens of it from Muscat and Algiers.

2. Dipterygium, *Decaisne.*

1. D. glaucum (*Dcne. in Ann. Sc. Nat.* ser. 2, iv. p. 67). Foliis petiolatis, ovatis vel lanceolatis, integris, herbaceis, glabris, vel crassiusculis scabridis; sepalis æqualibus, lanceolatis, obscure trinerviis, extrorsum glandulosis; petalis lanceolatis, obtusis, unguiculatis, sepalis longioribus; stylo tereti, stigmate capitato; ovario sessili, tetraquetro, angulis dentato-alatis; siliculis indehiscentibus, compressis, elliptico-oblongis, scorbiculatis, crustaceo-corrugatis.—*D. scabrum*, Decaisne, fide Boiss. in Auch. Pl. Arab. n. 4150 (absque descriptione). *Pteroloma Arabicum*, Hochst. et Steud. in Schimp. Pl. Arab. Fel. n. 851.

Hab. Aden, a littore usque ad alt. 1000 ped. in monte "Jibeel Shumshum" (*Hook. fil.*! *T. Anders.*).

Distr. In Arabia Felici! et Petræa! Nubia! Scinde! Punjab!

Herba perennis, subvirgata, glabra vel scabrido-glutinosa, subaphylla.

Ramuli teretes, rigidi, diffusi. *Folia* 2–10 lin. longa, 1–3 lin. lata. *Sepala* interdum glabra, 1 lin. longa; juniora violacea. *Petala* demum subdeflexa, viridescentia aut alba. *Siliculæ* alis cristatis; duæ laterales majores, duæ antica et postica minores inconspicuæ; uniloculares, abortu monospermæ.

3. DIPLOTAXIS, *DC.*

1. D. PENDULA (*DC. Syst.* vol. ii. p. 630, et *Prod.* i. p. 222). Foliis obovatis, lanceolatis, grosse dentatis, hispidis; sepalis ovatis, tomentosis; siliquis pedicellatis, pendulis, glabris, linearibus, basi attenuatis; stylo brevissimo, stigmate bilabiato.—*D. crassifolia, D. Lagascana, D. hispida* (DC. in Syst. atque Prod. *l. c.*). *D. nana* (Boiss.).

Hab. Aden, in arenosis sterilibus (*Hook. fil.* !).

Distr. In Arabia Felici! et Petræa, Ægypto! Syria! Persia! Algeria! Hispania! Sicilia!

Herba in hirsutia foliorumque forma multum varians; corolla et siliquis exceptis, plerumque hispida. *Corolla* flava, magna.

Ordo II. CAPPARIDACEÆ.

Tribus I. CLEOMEÆ, *Linn.*

1. CLEOME, *Linn.*

Sect. *Pedicellaria.* Torus carnosus; thecaphorus elongatus.

1. C. PARADOXA (*R. Br. in Salt. Abyss.*; *DC. Prod.* vol. i. p. 241). Caule basi suffruticoso, erecto, glabro, apice glandulis nigris scabro; foliis 3–6-foliolatis; foliolis linearibus, lanceolatis, acutis, mucronatis, glaucis; petiolis foliolis duplo longioribus, muricatis; racemis terminalibus, in fructu elongatis, laxis, subaphyllis; pedunculis thecaphorisque glandulosis, scabris; sepalis ovatis, glandulosis; petalis unilateralibus, apice et marginibus glandulosis, duobus majoribus spathulatis, duobus brevioribus breviter unguiculatis; staminibus 6; stylo brevi, crasso, basi glanduloso; stigmate obtuso; siliquis stipitatis, linearibus, utrinque acutis, glabris, venosis; seminibus biseriatis, glabris, globosis.—*C. muricata,* Edgew. in Journ. Soc. Asiat. Bengal. xvi. p. 1212.

Hab. Aden, ubique in arenosis (*Edgeworth, Hook. fil. et T.*! *Madden*! *T. Anders.*).

Suffrutex perennis, 2-3-pedalis, glaucus, apice glanduloso-scaber, foliosus, ramosus. *Foliola* 1–1½ unc. longa. *Petiolus* foliolo triplo longior. *Flores* magni, flavi. *Siliqua* 4½ lin. longa, pendula; valvis planis 4 lin. latis.

Sect. *Siliquaria.* Torus parvus; thecaphorus brevis vel nullus.

† *Foliis simplicibus.*

2. C. QUINQUENERVIA (*DC. Prod.* i. p. 239). Herbacea, glauca, subpubescens aut glanduloso-hirsuta; foliis longe petiolatis, ovatis, basi subcordatis, 5-nervibus, floralibus minoribus; floribus axillaribus; sepalis linearibus, pubescentibus, margine ciliatis; petalis ovatis; staminibus 6; stylo gracili, glabro; stigmate rotundo, obtuso; siliquis sessilibus, ovato-oblongis, glanduloso-scabris, stylo brevi apiculatis.

Hab. Aden, in arenosis prope littus (*Madden*!).

Distr. In Persia! Affghanistan!

Herba annua. *Folia* longe petiolata, late ovata. *Siliqua* erecta, 1 unc. longa, subteres. *Stylus* brevis, 1 lin. longus. *Flores* pallide flavi.

3. C. PRUINOSA (*T. Anders.*). Caule ramosissimo, subglabro; ramis pruinosis, pilis patentibus subhirsutis, foliosis; foliis petiolatis, ovatis, acuminatis, trinerviis, papillis scabris sparse hirsutis, marginibus glandulosis subserratis; floribus axillaribus solitariis; sepalis lanceolatis, subglandulosis; petalis linearibus, unguiculatis; staminibus 4; siliquis sessilibus, erectis, glandulosis, teretibus, oblongis, stylo persistente deflexo apiculatis.

Hab. Aden, copiossisime (*Hook. fil.*! *T. Anders.*).

Suffrutex parvus, apice glandulosus, sparse pilosus. *Folia* longe petiolata, 4–8 lin. longa, 3–6 lin. lata; petiolus ¾ unc. longus. *Stylus* gracilis, glaber, 4 lin. longus. *Siliqua* glandulosa, longitudinaliter sulcata, 8 lin. longa. *Flores* viridi-flavi.

A species very near *C. droseræfolia*, but differing from it in being almost glabrous, in the shape of the leaves, and in the shorter styles. It may eventually prove to be a state of *C. droseræfolia*, especially as that plant has not been found at Aden, though it is common in Arabia Petræa, and Egypt.

4. C. PAPILLOSA (*Steud. Nomencl.* ed. 2, i. p. 382). Herbacea, gracilis; caule erecto, pilis patentibus hirsutis; foliis ovatis, basi subcordatis, margine integro, pilis strigosis papillisque duris scabris, inferioribus longe petiolatis, superioribus sessilibus; racemis laxis; floribus pedunculis filiformibus; sepalis lanceolatis, glandulosis; petalis lanceolatis, longe unguiculatis; staminibus 6; siliquis glabris, filiformibus, teretibus, patentibus, pedicello multo longioribus, transversim corrugatis, rubris; seminibus uniseriatis.—*C. gracilis*, Edgew. in Journ. Soc. Asiat. Bengal. vol. xvi. p. 1212. *C. linearis*, Stocks, MSS. in Herb. Hook.

Hab. Aden, in locis saxosis (*Edgew.*, *Hook. fil.*! *T. Anders.*).

Distr. In Abyssinia! Scinde! Punjab!

Herba gracilis, annua, aromatica, odore moschato. *Folia* integra. *Corolla* junioribus violacea, interdum flava. *Siliqua* glabra, filiformis, 1 unc. longa.

†† *Foliis trifoliolatis.*

5. C. BRACHYCARPA (*Vahl*, ined.; *DC. Prod.* i. p. 240). Caule ramoso, suberecto, glanduloso, apice scabro; foliis 3–5-foliolatis, petiolatis; foliolis ovatis, oblongis; floralibus sessilibus, 3-foliolatis vel integris; floribus laxe racemosis, pedicellatis; sepalis lanceolatis, petalis multo brevioribus, glandulosis; petalis ovatis, unguiculatis, glabris; staminibus 6; stylo erecto, glabro, siliqua dimidio breviore; stigmate rotundo; siliquis ovatis, glandulosis, patentibus, demum erectis, stylo capitatis. —*C. Vahliana*, Fresen. Mus. Senckenb. ii. p. 110. *C. diversifolia*, Hochst. et Steud. in Schimp. Pl. Arab. Fel. n. 762. *C. moschata*, Stocks, MSS. in Herb. Hook.

Hab. Aden, in arenosis vulgatissime (*Edgew., Madden, Hook. fil., T. Anders.*).

Herba annua? suberecta, ramis diffusis. *Pedicelli* graciles, siliqua fere duplo longiores. *Flores* flavi.

Tribus II. CAPPARIDEÆ.

2. CADABA, *Forsk.*

1. C. GLANDULOSA (*Forsk. Descr.* p. 68). Foliis subrotundis, ovalibus, mucronatis vel obtusis, crassiusculis, hirsutis, glandulosis; racemis terminalibus paucifloris, floribus pedunculatis; sepalis spathulatis, glandulosis; petalis nullis; staminibus 5, filamentis glabris; toro ligulæformi, petaloideo, staminibus longiore; ovario stipitato, glanduloso; stigmate sessili; capsulis ovato-oblongis, pedicellatis, glanduloso-hirsutis.—*Strœmia glandulosa*, Vahl, Symb. vol. i. p. 20. *Cadaba monopetala*, Edgew. in Journ. Soc. Asiat. Bengal. xvi. p. 1212.

Hab. Aden, in monte "Jibeel Shumshum" dicto, ad altitudinem 1000 ped. (*Edgeworth, Hook. fil. et T.*! *T Anders.*).

Distr. In regione Tehama Arabiæ Felicis.

Frutex apice hirsutus, viscosus, ramosissimus. *Folia* integerrima, petiolata, 4–10 lin. longa, 3–6 lin. lata, petiolum æquantia. *Flores* apetali. *Capsula* baccata, semipollicaris.

2. C. LONGIFOLIA (*DC. Prod.* i. p. 244). Fruticosa, ramosa, glabra; foliis linearibus, oblongis, glabris, coriaceis; racemis terminalibus; floribus pedunculatis; sepalis 4, cruciatis, duobus majoribus exterioribus ovatis acutis, interioribus ovatis; petalis 4, lanceolatis, unguiculatis, minutis; staminibus 4; toro elongato; ovario stipitato, glanduloso; capsula baccata; seminibus teretibus, glandulosis.—*Strœmia longifolia*, R. Br. in Append. Salt. Abyss. n. 64.

Hab. Aden (*Hook. fil.*! *T. Anders.*).

Distr. In Abyssinia!

Frutex ramosus, glaber, foliis petiolis pedunculis sepalis ramisque junioribus minutissime pruinosis. *Folia* 1½–2 unc. longa. *Torus* elongatus, 8 lin. longus, stipitem æquans. *Flores* violacei?

In the Hookerian Herbarium there is a glabrous specimen of *Cadaba Indica*, Lam., which, except by its having the pale-yellow flowers of that species, I cannot distinguish from some broad-leaved herbaceous specimens of *C. longifolia* from Aden. The normal states of *C. longifolia* and *C. Indica* are, however, markedly different.

3. CAPPARIS, *Linn.*

1. C. GALEATA (*Fresen. in Mus. Senck.* ii. p. 111). Fruticosa, glauca, ramis diffusis, foliosis; foliis petiolatis, ovatis, crassis, mucrone recurvo uncinatis; stipulis duabus, spinosis; floribus solitariis, axillaribus; pedunculo foliis longiore, erecto, in fructu deflexo; sepalis 4, sepalo maximo galeato; petalis subrotundis, glabris; staminibus numerosis; fructu baccato, pyriformi, angulato; thecaphoro longo, pedunculum æquante; seminibus reniformibus, testa crustacea.—*C. Murrayana*, Grah. Cat., et Wight, Icones, t. 379. *C. cartilaginea*, Dcne. in Ann. Sc. Nat. ser. 2. vol. iii. p. 273. *C. uncinata*, Edgew. in Journ. Soc. Asiat. Bengal. xvi. p. 1213.

Hab. Aden, in rupibus (*Edgew.*, *Hook. fil. et T.*! *T. Anders.*).

Distr. In Arabia Petræa! Ægypto! Scinde! in ora occidentali peninsulæ Indiæ orientalis.

Frutex glaucus, ramis junioribus pulverulentis, *stipulis* aurantiacis uncinatis. *Folia* cartilaginea, 1½–2 unc. longa, 1–2 unc. lata; petiolus foliis brevior. *Petala* et stamina alba, denique pallide purpurea aut purpureo-rubra. *Fructus* maturus ruber, 8–10-costatus, 4 unc. longus, 1½ unc. latus. *Stipes* 2 unc. longus.

It is impossible to distinguish this plant by any essential characters from states of that protean species *Capparis spinosa*, L.

To *Capparis spinosa* I unite *C. Ægyptiaca*, Lam., *C. herbacea*, Willd., *C. ovata*, Bieber, *C. rupestris*, Linn., *C. obovata*, Royle, *C. ovata*, Desf., *C. mucronifolia* and *C. parviflora*, Boiss., *C. Sicula*, Guss. In all of these so-called species, and especially in *C. herbacea* and *C. rupestris*, specimens are constantly occurring in which the slightly recurved mucro of the leaf, the large flowers with a more or less galeate sepal, large-angled fruit, and the glaucous state of the whole plant indicate an affinity to *C. galeata*. As, however, some of the steps are wanting, I have for the present kept *C. galeata* distinct from *C. spinosa*.

4. MÆRUA, *Forsk.*

1. M. THOMSONI (*T. Anders.*). Virgata, glaberrima; foliis linearibus, oblongis, coriaceis, mucronatis, brevi-petiolatis; floribus solitariis, pedunculatis; calyce tubuloso, brevissime 4-partito; fructu carnoso, stipitato, glabro, toruloso.

Hab. Aden (*Hook. fil. et T.*!).

Frutex glaberrimus, virgatus, foliosus, ramis paucissimis, cortice punctato. *Folia* in ramis floriferis fasciculata oblonga, in aliis alterna linearia. *Thecaphorus* pedunculo longior.

Ordo III. RESEDACEÆ.

1. Reseda, *Linn.*

1. R. amblyocarpa (*Fresen.*). Subpruinosa; foliis integris, superioribus rarissime ternatim incisis, ovato-lanceolatis, basi attenuatis; floribus spicatis; bracteis deciduis, longe subulatis; pedicellis calycem æquantibus vel longioribus; sepalis 6, inæqualibus, linearibus, deciduis; petalis 5, duobus majoribus 5–10-partitis, tribus brevioribus bipartitis vel integris; capsulis obovatis, obtuse tridentatis; seminibus minutis, reniformibus, nigris, asperulis.

Hab. Aden, juxta mare (*Edgew.*, *Hook. fil. et T.*! *Madden*! *Schomburgk*! *Harvey*! *T. Anders.*).

Distr. In Abyssinia!

Herba ramosa, subpruinosa. *Caulis* perennis, striatus, angulosus. *Folia* plerumque integra, utrinque acuta, in petiolum attenuata, 2 unc. longa, 3 lin.–$\frac{1}{2}$ unc. lata. *Flores* parvi, bracteis deciduis. *Capsula* tridentata, truncata. *Semina* pauca, nigra, asperula, punctata.

After a careful examination of the species of *Reseda* in the Hookerian Herbarium, and the study of Mueller's elaborate monograph of the order, I can find no character, except the nature of the seeds, to separate this species from *R. pruinosa*, Del., or *R. Aucheri* and *R. bracteata*, Boiss., which seem to be merely varieties of *R. pruinosa*.

Having made numerous dissections of all the species allied to *R. pruinosa*, Del., I am convinced that no specific character of the slightest value can be obtained from the number of the divisions or the shape of the petals. I consider *R. amblyocarpa*, Fresen., to be probably distinct from *R. pruinosa*, Del., and its varieties,—from its having a perennial stock, almost always entire leaves, a larger and denser spike, smaller flowers, and a slightly different capsule containing much smaller, black and punctate seeds. *Reseda pruinosa* is evidently an annual, with generally trifid leaves; it has shorter spikes, larger flowers, and seeds nearly as large again as those of *R. amblyocarpa*, of a dark olive colour, and with an almost perfectly smooth testa. Both, however, are pruinose. The seeds of *R. pruinosa* are also sometimes slightly punctate, and *R. Aucheri*, Boiss., which ranks only as a variety of *R. pruinosa*, has often leaves as entire as those of *R. amblyocarpa*. In *Resedaceæ* the duration of the stock is probably an uncertain character, subject to the influence of climate, and especially to the amount of moisture.

Ordo IV. POLYGALACEÆ.

1. Polygala, *Linn.*

1. P. triflora (*Linn. Fl. Zel.* p. 269). Caule erecto, pubescente pilis adpressis; foliis subsessilibus, ovato-oblongis, apice rotundatis, utrinque incano-tomentosis; floribus breviter racemosis; racemis pedunculatis.

sessilibus, 4–6-floris; alis obovatis obtusis, pubescentibus, capsula paulo longioribus; carina cristata, rosea; capsulis oblongis, marginatis vel emarginatis, ciliatis; seminibus pilosis.—*P. paniculata*, Forsk. Fl. Arab. n. 429. *P. obtusata*, DC. Prod. i. p. 326. *P. erioptera*, DC. *l. c.* *P. Vahliana*, DC. *l. c.* *P. arvensis*, Willd. sp. 3. p. 876. *P. Rothiana*, W. et A. Prod. Fl. Pen. Ind. Or. p. 37. *P. glaucoides*, Wight in Wall. Cat., sed non Linn. *P. grandiflora*, Wall. Cat. *P. serpyllifolia*, Poir. Wall. Cat. *P. Noucherensis*, Camb. in Voy. Jacq. iv. p. 24. *P. Arabica*, Edgew. in Journ. Soc. Asiat. Bengal. xvi. p. 1213.

Hab. Aden, in arenosis depressis (*Edgew.*! *Hook. fil.*! *Madden*! *T. Anders.*).

Distr. In Arabia Felici! Muscat! India orientali! Ægypto superiore! Abyssinia! Africa centrali! Senegal! insulis Capitis Viridis!

Ordo V. CARYOPHYLLACEÆ.

1. Mollugo, *Ser.*

1. M. Cerviana (*Ser. MSS.*; *DC. Prod.* i. p. 392). Glabra, caulibus adscendentibus, teretibus, verticillatis; foliis glaucis, in verticillis irregularibus confertis, radicalibus oblongis obtusis, caulinibus linearibus; floribus 2–3, umbellatis; pedunculis elongatis, gracilibus; petalis nullis; staminibus quinque, seminibus glabris.—*Pharnaceum Cerviana*, Linn. Spec., ed. 1, p. 272.

Hab. Aden, in umbris arbuscularum atque in arenosis (*Hook. fil.*! *T. Anders.*).

Distr. In pen. Indiæ orientalis! Punjab! Ceylania! Siberia australi! Abyssinia! Senegal! Europa australi! capite Bonæ Spei!

Herba tenera, glauca. *Caules* teretes, 1–4-unciales; verticilla caulina foliorum 2–3-foliata..

2. Sphærocoma, *T. Anders.*

1. S. Hookeri (*T. Anders. in Journ. Proc. Linn. Soc.* v. p. 15). Caule erecto, lignoso, ramoso, cortice glauco; foliis in nodis oppositis, caulinis fasciculatis, carnosis, teretibus, apice obtusis, basi attenuatis; glomerulis pedunculatis, ebracteatis; floribus dense aggregatis; sepalis ovatis, concavis, mucronatis, florum sterilium linearibus, in fructu setaceis, setis integris; capsula, calyce et corolla squamis persistentibus inclusis.

Hab. Aden (*Hook. fil.*).

Fruticulus 2-pedalis, ramosus, glaberrimus, glaucus; caulis nodis oppositis foliosis. *Folia* 6–10 lin. longa. *Glomeruli* fusci, 1–3 lin. longi. *Pedunculi* erecti, 1–1½ lin. longi, bracteis 1–2, sepaloideis. *Utriculus* parvus, subchartaceus.

Ordo VI. MALVACEÆ.

1. Hibiscus, *Linn.*

Sect. *Bombicella.*

1. H. Welshii (*T. Anders.*). Caule suffruticoso, glanduloso, punctato, foliis petiolatis, late ovatis, 3-5-lobatis, cordatis, margine dentato-serratis, glandulis nigris utrinque punctatis; petiolis superne hirsutis; pedunculis axillaribus, solitariis, unifloris, petiolum æquantibus, supra articulum incrassatis; involucello 10-phyllo, segmentis subulatis parvis; calyce 5-dentato, nigrescente, glandulis hirsutis obtecto; carpellis lanceolatis, pilis sparsissimis puberulis, extus cortice glanduloso reticulato; seminibus pilis fulvis, dense gossypinis.

Hab. Aden, rarissime (*Hook fil. et T.! T. Anders.*).

Suffrutex glandulosus. *Cortex* subglaucus. *Folia* glandulis asperis scabra, $\frac{1}{2}$–1 unc. longa, $\frac{1}{2}$–1$\frac{1}{2}$ unc. lata; petiolus 1–2 unc. longus. *Corolla* ignota.

I have named this very distinct species after my friend Dr. Welsh of the Bombay Army, the Civil Surgeon of Aden. I am much indebted to him for his kindness in accompanying me during my herborizations, and in showing me many of the rarer plants of the settlement, and among them this species.

Tab. I. Fig. 1, portion of leaf; 2, flower-bud; 3, section of the same; 4, sepal; 5, anthers; 6, single anther, showing mode of dehiscence; 7, cross section of ovary; 8, outer surface of a single carpel; 9, seed; 10, section of same; 11, embryo. With the exception of fig. 9, all are magnified.

2. H. micranthus (*Linn. fil. Suppl.* p. 308). Suffruticosus, caule pilis stellatis aspero; foliis petiolatis, ovatis, subrotundis, indivisis, acute serratis, scabris; pedicellis axillaribus, foliis longioribus; involucello 5–7-phyllo, setaceo; calyce breviore; corolla reflexa; capsula subglobosa; seminibus sericeis.—*H. rigidus*, Linn. fil. Suppl. p. 310. *H. ovalifolius*, Vahl, Symb. i. p. 50. *Urena ovalifolia*, Forsk. Descr. p. 124. *H. clandestinus*, Cav. Ic. i. p. 1, t. 2. *H. micranthus*, Cav. Diss. iii. p. 155, t. 66. f. 1. *H. intermedius*, Hochst. in Schimp. Pl. Abyss. n. 2211. *H. parvifolius*, Hochst. in *l. c.* n. 2275.

Hab. Aden, prope sepulchretum veterum (*T. Anders.*).

Distr. In Arabia Petræa! Muscat! India! Ceylania! Abyssinia! Mozambique! Senegambia!

2. Abutilon, *Tourn.*

1. A. denticulatum (*Planch. in Herb. Hook.*). Caule tomentoso; foliis ovatis, cordatis, acutis, denticulatis, glauco-tomentosis, petiolatis; pedicellis petiolo longioribus; calycis segmentis acutis; carpellis

8–10, truncatis, muticis, tomentosis, trispermis.—*Sida denticulata*, Fresen. Mus. Sencken. i. p. 82.

Hab. Aden (*Hook. fil. et T.*!).

Distr. In Arabia Petræa! Scinde! Ægypto superiore! Senaar!

Ordo VII. STERCULIACEÆ.

1. STERCULIA, *Linn.*

1. S. ARABICA (*T. Anders.*). Glabra, cortice cinereo; foliis petiolatis, rotundatis, late ovatis obtusis, vel subrhomboideis acutis, basi interdum subcordatis, integris vel crenatis, utrinque glaberrimis, stipulis subulatis; racemis in ultimis ramis vel axillaribus, simplicibus, paucifloris, folio multo brevioribus; pedunculis glabris; pedicellis apice pilosulis; bracteis minutis, subulatis; calyce ad medium 5-fido, utrinque piloso, laciniis patentibus; floribus masculinis tubo stamineo exserto, 10-lobato, glabro; folliculis 4, anguste ovatis, acutis, pubescentibus.—*S. Abyssinica*, R. Br. partim in Append. Salt. Abyss. et in Pl. Javan. Rar. p. 227.

Hab. Aden (*Hook. fil. et T.*!).

Arbuscula 8–10-pedalis, glaberrima, foliata; *ramuli* abbreviati, paulo incrassati; *ramuli floriferi* in nodis foliosis abbreviatis aut in longitudine petiolum æquantibus, stipulis deciduis obtecti. *Folia* 3–5-nervia, 1–1½ unc. longa, 1-2½ unc. lata; *nervi* viridescentes; petiolus teres, glaber, ¼-¾ unc. longus. *Racemi* ½–1 unc. longi, graciles. Flores parvi. *Folliculi* teretes, subrostrati, fulvo-pubescentes, ¾ unc. longi, ½ unc. lati.

Tab. II. A. *Sterculia Arabica* (T. Anders.): fig. 1, male flower; 2, same laid open; 3, anthers; 4, fruit, natural size. (Figures 1, 2, and 3 are magnified.) B. Leaf and fruit of *S. Abyssinica*, R. Br., natural size.

I have examined, on two distinct occasions, the original specimens of *S. Abyssinica*, R. Br., in Salt's Abyssinian plants in the British Museum, and at the same time compared them with ten or twelve specimens of the Aden species *S. Arabica*. I find that among Salt's specimens of *S. Abyssinica* there is a fragment of *S. Arabica*, consisting of a portion of a branch with three leaves, and a fruit of four follicles on a very short axillary peduncle; and from this the description in the 'Plantæ Javanicæ Rariores,' of the fruit and partly of the leaves, of *S. Abyssinica* was deduced. Though Salt's specimens of these two species of *Sterculia* are said to be from Abyssinia, they are possibly from quite distinct localities; for that traveller, after touching at several points on the east coast of Africa, visited Aden and Arabia Felix. Whenever a favourable opportunity occurred, he seems to have collected plants, but (judging from his herbarium in the British Museum) without appending any notes or records of stations to his specimens. It is probable that the specimens of *S. Abyssinica* were obtained at Mozambique, where

Salt spent several days; and the fragment of *S. Arabica* mixed with the former species is most likely from Aden.

Had R. Brown seen flowering specimens of *S. Arabica*, he would doubtless at once have distinguished the two species, and, moreover, would have united his *S. Abyssinica* with his other species *S. Triphaca*, described from an imperfect specimen in fruit in the Paris Herbarium, collected by Loureiro at Mozambique, and which seems to have been considered distinct by Brown, on account of the fruit differing from what he mistook for the fruit of *S. Abyssinica*, but which I have above shown to be the fruit of *S. Arabica*.

Figure B. of Plate II. is taken from a *Sterculia* in the Hookerian Herbarium, from near Mozambique, named *S. ipomeæfolia*, Gerke, a careful comparison of which with the original specimens of *S. Abyssinica*, R. Brown, convinces me that it is certainly the same as that species. *S. Arabica* is easily distinguished from *S. Abyssinica* by its short-petioled, rotund, rarely acute, and perfectly glabrous leaves, very short, axillary, simple, nearly glabrous racemes, and by the markedly different fruit, which is only half the size of that of *S. Abyssinica*.

The leaves, petioles, and peduncles of *S. Abyssinica*, besides possessing other and more important characters, are always more or less tomentose.

Ordo VIII. TILIACEÆ.

1. Corchorus, *Linn.*

1. C. Antichorus (*Roemschal, Nomencl. Bot.*, ed. 3, p. 158). Caulibus prostratis diffusis; foliis petiolatis, subrotundis, ellipticis, plicato-crenatis, serratis; floribus axillaribus, binis; capsulis siliquæformibus, lanceolatis, deflexis, quadrivalvis, glabris.—*Antichorus depressus*, Linn. Mant. p. 64. *Jussiæa edulis*, Forsk. Descr. p. 210. *Corchorus fruticulosus*, Vis. Pl. Ægypt. et Nubia, p. 21, t. 3. p. 2. *Corchorus humilis*, Munro in Hort. Agrensi.

Hab. Aden (*Hook. fil. et T.*! *Madden*! *T. Anders.*).

Distr. In Arabia Felici! Muscat! Scinde! India boreali-occid.! atque ad Madras! Africa boreali! insulis Capitis Viridis.

2. Grewia, *Juss.*

1. G. populifolia (*Vahl, Symb.* i. p. 33). Caule fruticoso, virgato, ramulis pilis stellatis sparse vestitis; foliis alternis, brevi-petiolatis, orbiculatis, dentato-crenatis, 3–5-venosis, glaberrimis, junioribus subtus pilis stellatis pubescentibus; pedunculis solitariis pubescentibus, unifloris, rarissime bifloris, folio brevioribus, bracteolis duabus oppositis; sepalis lineari-lanceolatis, extus pubescentibus, corolla longioribus; petalis linearibus, breviter bifidis; stylo staminibus longiore; stigmate 4-lobato; drupis 2–4-lobatis, pyrenis globosis glabris vel pilis sim-

plicibus puberulis.—*G. betulæfolia*, Roth, Nov. Spec. p. 249. *Chadra tenax*, Forsk. Fl. Arab. n. 338.

Hab. Aden, rarissime (*Hook fil. et T*!).

Distr. In Arabia Petræa! Persia! Scinde! India boreali-occid.! pen. Ind. orient! Senaar! Senegal!

Frutex plerumque glaber. *Cortex* pallidus, subnitidus, partibus puberulis, pilis stellatis sparse obtectis. *Folia* 1½–1 unc. longa, 4 lin.–1 unc. lata. *Pedunculus* 6–10 lin. longus. *Sepala* 6 lin. longa. *Drupæ* cortex flavus, nitidus.

Ordo IX. GERANIACEÆ.

1. Erodium, *L'Hérit.*

1. E. malapoides (*Willd. Sp.* iii. p. 640). Caulescens vel subacaule; foliis radicalibus ovatis, integris vel trilobatis, obtuse dentatis, basi cordatis, longe petiolatis, incano-tomentosis; pedunculis 2–3-floris; sepalis lanceolatis, acutis, 3-nerviis, dense pilosis; staminibus 5; stigmatibus 5; carpellis aristis barbatis.—*E. Arabicum*, Decaisne, Ann. Sc. Nat. ser. 2. vol. iii. p. 285. *E. bryoniæfolium*, Boiss. Diag. Pl. Orient. i. p. 61.

Hab. Aden, in arenosis maritimis (*Madden*!).

Distr. In Arabia Petræa! ad flumen Euphratem! in Persia! Beloochistan! Affghanistan! Punjab! Ægypto!

Herba perennis? depressa, incano-tomentosa. *Corolla* purpurea.

Ordo X. ZYGOPHYLLACEÆ.

1. Fagonia, *Tourn.*

1. F. cretica (*Linn. Sp.* p. 386; var. subinermis, *T. Anders.*). Caulibus erectis, patulis vel divaricatis ramosis; foliis paucis, simplicibus, rarissime trifoliolatis, ellipticis vel linearibus, obtusis vel acutis, mucronulatis, carnosis, subsessilibus; stipulis variabilibus, plerumque parvis inconspicuis seu longis gracilibus, acute spinescentibus; pedunculo tenui, deflexo, unifloro; capsula acuminata, subglabra.—*F. Hispanica*, Linn. Sp. p. 386; *F. Arabica*, Linn. *l. c.*; *F. glutinosa*, Delil. Fl. Æg. p. 86, t. 28; *F. mollis*, Delil. *l. c.* p. 76, t. 27. f. 2; *F. latifolia*, Delil. *l. c.* p. 86, t. 28. f. 3; *F. cistoides*, Delil. in herb. Bové, n. 169; *F. Mysorensis*, Roth, N. Sp. p. 215; *F. Oliveri*, DC. Prod. i. p. 704; *F. Persica* DC. *l. c.*; *F. Bruguieri*, DC. *l. c.*; *F. acerosa*, Boiss. Diag. Pl. Or. viii. p. 124; *F. Aucheri*, Boiss. *l. c.* i. p. 62; *F. echinella*, Boiss. *l. c.* viii. p. 123; *F. grandiflora*, Boiss. *l. c.* p. 121; *F. Kahirana*, Boiss. *l. c.* p. 122; *F. myriacantha*, Boiss. *l. c.* p. 123; *F. parviflora*, Boiss. *l. c.* p. 124; *F. Sinaica*, Boiss. *l. c.* i. p. 61; *F. subinermis*, Boiss. *l. c.* p. 62; *F. Thebaica*, Boiss. *l. c.* viii. p. 121; *F. Californica*, Benth. Bot. Sulph. Voy. p. 10; *F. Chilensis*, Hook. et Arn. in Bot.

Misc. iii. p. 165; *F. virens,* Coss in Kralik. Pl. Alger.; *F. fruticans,* Coss, *l. c.*; *F. diversifolia,* Boiss. in Pl. Or. nov. ser. vol. ii. p. 113.

Hab. Aden, in locis arenosis convallium (*Edgew., Hook. fil. et T.*! *T. Anders.*).

Distr. In Europa Mediterraneana! Africa ab Algeria usque ad caput Bonæ Spei! Asia tropica et calidiore tota! Chili! California!

I have devoted several days on two occasions to the examination of a most extensive suite of authentic specimens of the many described species of this genus, and both times I arrived at the same conclusion—that there is but one species. The Kew Herbarium contains about 400 specimens of *Fagonia*; and these I attempted to divide into De Candolle's two sections, of leaves simple and leaves trifoliolate. The result of this first apportioning was, that the one-leaved section contained only ten specimens, while 390 remained in the section with trifoliolate leaves. The ten simple-leaved specimens belonged to the following species: 2 of *F. cretica,* Linn.; 1 of *F. Oliveri,* DC.; 2 of *F. myriacantha,* Boiss.; 1 of *F. parviflora,* Boiss., and 4 of *F. subinermis,* Boiss. The remaining 390 specimens, all of which were more or less trifoliolate, included all the described species of *Fagonia.* The next step was the selection from the 390 specimens of all the individuals in which trifoliolate leaves alone occurred. These amounted to 123 specimens, leaving 267 as intermediate with the simple-leaved and trifoliolate sections. These 123 specimens, in which every leaf was trifoliolate, comprised the following species entirely:—*F. latifolia,* Delil.; *F. mollis,* Delil.; *F. cistoides,* Delil.; *F. glutinosa,* Delil.; *F. Kahriana,* Boiss.; *F. grandiflora*; Boiss.; *F. virens,* Coss; *F. Chilensis,* Hook. et Arn.; *F. Californica,* Benth., and in part *F. cretica,* Linn.; *F. Arabica,* Linn., and *F. Sinaica,* Boiss. Only one specimen, however, of *F. Arabica,* Linn., and a few of *F. cretica,* Linn., had wholly trifoliolate leaves. The remaining section, of 267 specimens having both simple and compound leaves, consisted almost entirely of *F. cretica,* Linn.; and of *F. Arabica,* Linn., with *F. Sinaica,* Boiss., and *F. parviflora,* Boiss., with the exception of one specimen of each, and included the whole of *F. Bruguieri,* DC., *F. Thebaica,* Boiss., and *F. echinella,* Boiss., *F. diversifolia,* Boiss., *F. fruticans,* Coss, and *F. Mysorensis,* Roth. The form and size of the leaves and stipules are also most variable; in some specimens the leaves are nearly absent, and their place is supplied by the long and hard spiny stipules; in others, such as *F. subinermis,* Boiss., and in the plant from Aden, the leaves are for the most part simple with inconspicuous stipules, but in some states of this variety, as well as the other so-called species, the leaves are nearly elliptical, and the spines exceed the leaves in length. The shape and relation of the parts of the flower and fruit vary but little, though in a few cases there is some variation, of the extremes of which, Boissier has constituted two species under the names *F. grandiflora* and *F. parviflora.* There is also great difference in the amount of general pubescence; it varies from nearly perfect smoothness to viscosity, as in the states *F. glutinosa,* Delil., and *F. mollis,* Delil., and some specimens of *F. latifolia,* Delil. The species

from North and South America, described as *F. Chilensis* and *F. Californica*, do not differ in any respect from many states of *F. cretica*, to which I unite them. In *F. Californica* the spiny stipules are very short, and the sepals somewhat more lanceolate and a little longer than in the mass of specimens of *F. cretica*; but there is in the Hookerian Herbarium a specimen from Arabia Petræa which it is quite impossible to distinguish from the Californian specimens. Dr. Hooker has also been unable to find permanent characters by which to distinguish any of the described species from *F. cretica*, and he agrees with me in considering all as varieties of one variable species.

2. ZYGOPHYLLUM, *Linn.*

1. Z. SIMPLEX (*Linn. Mant.* p. 68). Caule prostrato, dichotomo, diffuso; foliis sessilibus, simplicibus, cylindricis, carnosis, obtusis; floribus parvis, solitariis, pedunculis brevissimis, in fructu deflexis; sepalis obovatis, apice cucullatis; petalis spathulatis, patentibus; capsulis oblongis, subrotundis, 5-angulis, rugosis, loculis 2–5-spermis.—*Z. portulacoides*, Forsk. Descr. p. 88.

Hab. Aden, ubique in arenosis (*Edgew.*, *Hook. fil. et T.*! *Madden*! *T. Anders.*).

Distr. In Arabia Petræa! et Felici! Scinde! Ægypto! Africa occid.! insulis Capitis Viridis!

Subherbaceum, perenne? viride, carnosum. *Caulis* rubescens. *Flores* parvi, numerosi, flavi.

Subclassis II. **Calycifloræ.**

Ordo XI. RHAMNEÆ.

1. ZIZYPHUS, *Tourn.*

1. Z. LOTUS (*Lam. Dict.* iii. p. 318). Ramulis spinosis, gracilibus; foliis ovatis, trinerviis, obsolete crenatis, subtus molliter tomentellis, aculeis binis, breviore recurvo, altero recto, petiolo longiore; floribus geminis, axillaribus; pedunculo petiolo multo breviore, deflexo; stylis duobus; ovariis bilocularibus; drupis subglobosis.

Hab. Aden (*Hook. fil. et T.*!)

Distr. In Arabia Petræa! Affghanistan! Algeria! Hispania!

Arbuscula. *Cortex* albidus. *Folia* 6 lin.–1½ unc. longa, 4 lin.–1 in. lata; petiolus 6 lin. longus. *Flores* inconspicui. *Drupa* solitaria, magnitudinis cerasi.

Ordo XII. TEREBINTHACEÆ.

1. BALSAMODENDRON, *Kunth.*

1. B. OPABALSAMUM (*Kunth, Gen. Terebinth.* p. 16; var. glabra, *Hook. fil. in Herb. Hook.*). Glabrum, foliis bi- trijugis, rarissime simplicibus,

integris; foliolis lateralibus ovatis, terminali obovato; calyce persistente, campanulato, 4-dentato; petalis obovatis; staminibus 8, æquilongis; stylo antheris breviore; stigmate tetragono, obtuso. Fructu ovato, acuto, glabro, in sicco tetragono, biloculari, monospermo.

Amyris Opabalsamum, Forsk. Descr. p. 79. *B. pubescens,* Stocks in Bombay Trans. 1847, et Journ. of Bot. i. p. 264.

Hab. Aden, in monte Jibeel Shumshum, ad alt. 1500 ped. (*Hook. fil.*!).

Distr. In Arabia Felici! Beloochistan!

Arbor mediocris, 15-pedalis, inermis, balsamifera. *Truncus* basi incrassatus. *Rami* divaricati, cortice cinereo, lævi, tenui. *Flores* monoici, in apice ramulorum brevissimorum aggregati, subsessiles vel breviter pedunculati. *Corolla* rubra. Lignum, cortex, fructusque odorem balsamineum emittentes.

Dr. Stocks, in the 'Bombay Transactions' for 1847, says that this tree produces a gum of no value, and that the resin of commerce is yielded by *Balsamodendron Mukul,* Hook.

Ordo XIII. MORINGEÆ.

1. Moringa, *Juss.*

1. M. aptera (*Gärtn. Fruct.* ii. p. 315). Ramis divaricatis, nudis; foliis ad raches reductis; rachibus bi-tripinnatis, 4–8-jugis, deflexis; foliolis ovatis, obtusis, integris; paniculis erectis, axillaribus; floribus herbaceis, glaucis, pedicellatis; pedicellis bracteolatis, articulatis; calyce 5-partito, segmentis imbricatis, subæqualibus, oblongis; petalis oblongo-linearibus, reflexis; staminibus 10, inæqualibus; antheris unilocularibus; ovario libro, stipitato, 3-sulcato; fructu leguminiformi, longe rostrato, ad apicem inter semina valde constricto; leguminibus obscure trigonis, 3-valvis, valvis extus longitudinaliter bisulcatis, 3-fastigiatis; seminibus turbinatis, trigonis, pendulis; testa crustacea.

M. Zeylanica, Linn. Sp. Plant. p. 546, et Delil. *Hyperanthera,* Forsk. Desc. p. 67. *Balanus myrepsica,* Belon, Obs. p. 126.

Hab. Aden, spontanea in vallibus saxosis prope locum "Steamer Point" dictum (*T. Anders.*).

Distr. In Arabia Petræa! Syria! Muscat! Ægypto superiore!

Arbor Arabica, 10–12-pedalis. *Cortex* cinereo-fuscus. *Ramuli* juniores virides. *Raches* sæpissime foliola gerentes, pedales. *Corolla* pallide flava. *Fructus* 8 unc.–1 ped. longus, deflexus. *Semina* oleaginea.

The seeds of this tree are said by Decaisne to yield the Ben oil of commerce; and he quotes the old traveller Belon as his authority. Guibourt also says that the true Ben oil is derived from *M. aptera,* Gärtn.; and De Candolle, who, however, doubts the distinctness of the species from *M. pterygosperma,* is of the same opinion. Lindley and Simmonds, and more recently Major Drury in India, agree in considering *M. pterygosperma* as the source from which the oil is obtained. Guibourt also mentions

an oil procured from this species. In the Museum of Economic Botany at Kew, there are specimens of an oil from the West Indies, Honduras, and also from Madras, extracted from the seeds of *M. pterygosperma,* and in every respect identical with the true Ben oil. In India the natives use this bland inodorous oil for retaining the perfume of delicate flowers, such as jasmine. It seems that both species therefore yield an oil similar in every respect, but that Ben oil was originally obtained from *M. aptera.* This is the more probable from "Ben," or "Ban," the Arabic name for the oil, being coextensive in use with the geographical distribution of the Aden species. In India the oil of *M. pterygosperma* is called "Soujhna," the word "Ben" being there unknown. Linnæus seems to have considered the two as varieties of one species, as in the 3rd edition of the 'Species Plantarum,' p. 546, under *M. Zeylanica,* he remarks, "Semina ex Asia tribus membranis longitudinaliter alata fuere; ex Africa vero membranis caruere."

Ordo XIV. LEGUMINOSÆ.

Subordo PAPILIONACEÆ.

1. ARGYROLOBIUM, *Eck. et Zey.*

A. ARABICUM (*Jaub. et Spach, Ill. Pl. Or.* i. p. 115). Ramis diffusis, gracilibus, teretibus, pilis adpressibus sericeo-pilosis; foliis trifoliolatis; foliolis plerumque linearibus, sæpe ovatis, margine revolutis; floribus pedunculatis, petiolis brevioribus, bifloris; calyce adpresse sericeo, segmentis lanceolatis, oblongis, acutis; corollæ vexillo subrotundo, emarginato, alis cultriformibus, obtusis; leguminibus linearibus, strigosis, undulatis, rostratis, stylo persistente acuminatis; seminibus 6–10, lenticularibus.—*Cytisus Arabicus,* Dcne. Ann. Sc. Nat., ser. 2. vol. iv. p. 78.

Hab. Aden, rarissime (*Hook. fil. et T*!).

Distr. In insula Neymen in Mare Rubro!

Suffrutex diffusus, ramosus, sericeo-pilosus. *Foliola* 2–6 lin. longa, plerumque angusta, linearia; petiolus 4–6 lin. longus. *Pedunculi* axillares, bracteolati. *Bracteolæ* parvæ, lanceolatæ. *Corolla* flava, glabra, calyce longior, 3 lin. longa. *Stamina* 10, monadelpha. *Stylus* filiformis, persistens, glaber. *Legumen* 1½ unc. longum, 1 lin. latum, basi calyce persistente vestitum.

Judging from the description only, *A. Bottæ,* Jaub. et Spach, from Jeddah, is probably the same as this species.

2. INDIGOFERA, *Linn.*

1. ARABICA (*Jaub. et Spach, Ill. Pl. Or.* v. t. 479). Argentea, sericea, ramulis diffusis; foliis 3–5-jugis vel trifoliolatis; foliolis oblongis, obovatis, mucronulatis, oppositis, stipulis subulatis, minimis; racemis axillaribus, multifloris, foliis brevioribus; calycibus profunde 5-fidis, seg-

mentis subulatis, setaceis; vexillo oblique obovato, breviter unguiculato, dorso sericeo, intus glabro, carina oblonga, biunguiculata; leguminibus planis, oblongis, cuspidato-acuminatis, valvis carinatis.

Hab. Aden, in saxosis (*Hook. fil.* !).

Distr. In Yemen, provincia Arabiæ Felicis! ad ‘Wade Katte” in Arabia Petræa!

Suffruticulus decumbens, 2–5-pollicaris, omnino sericeus. *Folia* petiolata; petiolus 3 lin. longus. *Foliola* 1–2 lin. longa. *Racemi* breviter pedunculati. *Flores* conferti, fructu deflexi. *Corolla* coccinea. *Capsula*-2–5-sperma. *Semina* lævia, nitida.

This plant is described by Jaub. and Spach as being sometimes one foot long; the specimens I have seen are all small and stunted, ranging from two to five inches in length.

3. POGONOSTIGMA, *Boiss.*

P. ARABICUM (*Boiss. Diag. Pl. Or.* ii. p. 39). Ramis adscendentibus; foliis petiolatis, stipulatis, plerumque bijugis, foliolis oppositis, lineari-oblongis vel lanceolatis, mucronatis, supra molliter pubescentibus, subtus sericeo-tomentosis, racemis elongatis; calycis segmentis subulatis, acutis; leguminibus suborbicularibus, acutis, stylo persistente longe apiculatis, monospermis.—*Psoralea Arabica,* Hochst. in Schimp. Pl. Arab. n. 775. *Catacline sericea,* Edgew. in Journ. Asiat. Soc. Bengal. vol. xvi. p. 1214.

Hab. Aden (*Edgew., Madden*! *Hook. fil. et T.*! *T. Anders.*).

Suffrutex 1–2-pedalis, sericeo-tomentosus. *Folia* ½–1½ unc. longa; foliola 2–6 lin. longa, terminale geminum, fere duplo longius. *Racemi* subaphylli. *Flores* solitarii vel gemini; pedicellus 1–2 lin. longus. *Calyx* sericeus. *Corolla* calyce longior; vexillum extus sericeo-hirsutum, purpureum. *Semen* olivaceum, 1½ lin. longum.

4. TEPHROSIA, *Pers.*

T. APOLLINEA (*DC. Prod.* ii. p. 254). Suffruticosa, diffusa, ramulis suberectis; foliis petiolatis, 3–4-jugis; foliolis oblongo-lanceolatis, cuneato-oblongis; floribus racemosis vel 3–4 axillaribus, pedunculis brevibus; calyce campanulato, dentibus subulatis; corolla calyce longiore; leguminibus patulis, linearibus, rostratis, planis, pubescentibus, 5–12-spermis.—*Galega Apollinea,* Delil. Fl. Æg. p. 144, t. 53. f. 5.

Hab. Aden, in rupibus (*Hook. fil.* !).

Distr. In Arabia Felici et Petræa! Scinde! Abyssinia! Ægypto superiore!

Suffrutex incano-tomentosus, stipulis subherbaceis, acute subulatis. *Folia* 1–2 unc. longa; foliola ½–1½ unc. longa, 1½–4 lin. lata, petiolo longiora. *Corollæ* vexillum extus sericeum, purpureum. *Legumen* 1½–3 unc. longum, 2–3 lin. latum.

5. TAVERNIERA, *DC.*

1. T. GLAUCA (*Edgew. in Journ. Asiat. Soc. Bengal*, xvi. p. 1214). "Glaberrima; foliis unifoliatis, carnosis, glabris, glaucis, rhomboideo-ovatis, suborbiculatis, emucronatis; stipulis 2, parvis, scariosis, cuneatis, acutis; racemis 5–10-floris; bracteis pedicello brevioribus, acutis, margine membranaceis; staminibus apice geniculatis, alternis brevioribus, decimo recto, multo breviore, geniculum vix attingente; legumine 2-articulato, setis introrsum arcuatis hispido."

"Next to *T. lappacea*, DC. ii. p. 339. Differs in smoothness, and the setæ of the legume are scarcely hamose; the stamens are more geniculate than is allowed to the generic character as given by DC. The pods are concealed by the withered, scarious, persistent petals."

"*Vexilla* magna, concava, per anthesin reflexa, subcarinata, breviter emarginata et calloso-mucronulata. *Alæ* angustæ, falcatæ, ellipticæ, basi truncato-auriculatæ, ungue brevi tenui vexillo plus duplo breviore. *Carina* vexillo major, obtusa. *Stylus* longus, basi tortuoso-geniculatus, filiformis, stigmate punctiformi apicali." No one has seen a *Taverniera* at Aden, except Mr. Edgeworth; and I know nothing of his plant, except from the description which I have quoted. If not identical with *T. glabra*, Boiss. (Diag. ii. p. 90), it is probably closely allied to it.

6. RHYNCHOSIA, *Lour.*

1. R. PULVERULENTA (*Stocks in Kew Journ. of Bot.* iv. p. 147). Molliter subincana; ramulis teretibus; foliis trifoliatis, petiolatis; foliolis super velutinis, subtus reticulato-venosis, lateralibus oblique subrotundis, obtusis, subsessilibus, terminalibus rhomboideis, petiolatis; floribus axillaribus, racemosis vel subsolitariis; racemis abbreviatis, 3–7-floris; bracteis pedicello paulo brevioribus; calycis segmentis subulatis, acutis, inferiore cæteris longiore; leguminibus deflexis, basi attenuatis, falcatis, tomentosis, dispermis; seminibus ovatis, lævibus.

Hab. Aden, in vallibus arenosis prope littus (*Hook. fil. et T.! T. Anders.*).

Distr. In Scinde!

Suffruticulus perennis. *Caulis*, in exemplis Arabicis, subprostratus seu volubilis. *Vexillum* extus subpubescens, flavum, 2 lin. longum. *Legumen* 6–8 lin. longum, 2 lin. latum. *Semina* fulva, punctis nigris notata.

This species is nearly allied to *R. Memnonia*, DC., but differs from it in the inflorescence, the length of the teeth of the calyx, and the colour and markings of the seed. In *R. Memnonia* the pubescence is more silvery-white, the leaves are more distinctly veined, and the pods are darker-coloured and broader than in *R. pulverulenta*.

Subordo CÆSALPINEÆ.

7. CASSIA, *Linn.*

1. C. PUBESCENS (*R. Br. in Salt, Abyss. App.*). Caule adscendente, obscure striato; foliis 6–9-jugis; foliolis oppositis, ovatis vel ovato-

oblongis, apice obtusis, rotundatis, emucronatis seu mucronulatis; petiolis eglandulosis; racemis axillaribus, multifloris, folio brevioribus; floribus breviter pedicellatis, bracteatis; bracteis subulatis, caducissimis; ovariis pubescentibus; stylis glabris; leguminibus oblongis, subreniformibus, utrinque rotundatis, falcatis, dense velutinis, 2–8-spermis; seminibus cuneiformibus, obtuse bilobatis, caudatis.—*C. Schimperi*, Steudel, Nomencl. Bot., ed. 2, i. p. 307; *C. pubescens* et *C. tomentosa*, Ehrbg. et Hemp.; *C. cana*, Wender. Linnæa, xii. p. 19.

Hab. Aden, in locis saxosis et glareosis (*Hook. fil. et T.*! *T. Anders.*).

Distr. In Arabia Felici in regione "Tehama" dicta! Scinde!

2. C. OBOVATA (*Coll. Mon.* p. 92). Caule erecto, striato; foliis 3–7-jugis, petiolis eglandulosis; foliolis oblique ovatis vel cuneato-oblongis, apice rotundatis obtusisve, plus minus mucronatis, glaucis; racemis axillaribus, plerisque folia superantibus, multifloris; floribus breviter pedicellatis, pedicellis apice incrassatis; sepalis subæqualibus; corolla calyce duplo majori; antheris longe linearibus; ovariis subglabris; stylis glabris; leguminibus subreniformibus, compressis, utrinque obtusis, ad medium tumido-cristatis, 6–9-spermis, valvis transversim venosis.—*C. Senna*, Lam. Ill. t. 332.

Hab. Aden (*Hook. fil. et T.*!).

Distr. In Arabia Felici! Scinde! Pen. Ind. orient.! Abyssinia! Ægypto! Africa centrali! Senegambia! Jamaica! Texas!

Suffrutex, species præcedente robustior, glaucus, partibus novellis pruinoso-glandulosis. *Folia* 2–5 unc. longa; stipulæ lanceolatæ, acutæ, demum reflexæ, persistentes; foliola ½–1 unc. longa, 3–5 lin. lata. *Sepala* glabra, nigrescentia, 4 lin. longa. *Petala* ovato-oblonga, obtusa, lineis nigro-purpureis notata, 5 lin. longa. *Legumen* stylo revoluto persistente apiculatum, glaucum, pilis simplicibus sparsissime obtectum, 1–1¼ unc. longum, 6–7 lin. latum.

Subordo MIMOSEÆ.

8. ACACIA, *Neck.*

Ser. *Gummiferæ*, Benth

§ *Summibracteatæ*, Benth.

1. A. EDGEWORTHII (*T. Anders.*). Caule glauco, ramulis novellis sæpe puberulis; petiolis subtomentosis; spinis rectis, longis, albescentibus vel puberulis; pinnis 4-jugis; foliolis 6–10-jugis, linearibus, obtusis, minute pruinosis; pedunculis folio brevioribus; leguminibus linearibus, falciformibus, crassis, tomentosis, obscure striatis, 14-spermis.—*A. erioloba*, Edgew.? Journ. Asiat. Soc. Bengal, xvi. p. 1215, non Benth.

Hab. Aden, frequenter (*Edgew.*, *Hook fil. et T.*! *T. Anders.*).

Arbuscula ab *A. Farnesiana* foliis leguminibusque differens. *Legumen* 5 unc. longum, 4 lin. latum.

§ *Medibracteatæ.*

2. A. EBURNEA (*Willd. Spec.* iv. 1081). "Ramulis foliisque ferrugineo-villosulis; spinis rectis, nonnullis longis, eburneis; pinnis 2–4-jugis, parvis, glandula petiolari majuscula; foliolis 6–8-jugis, minimis, linearibus, obtusis, hirtellis; pedunculis axillaribus, medio bracteatis; legumine stipitato, anguste lineari, falcato, subplano, glaberrimo."

Hab. Aden (*Hook. fil. et T.*! *T. Anders.*).

Distr. In Affghanistan! India orientali! Ceylania!

Folia spinis sæpius breviora; pinnæ vix 2 lin. longæ; foliola conferta, ½ lin. longa. *Legumen* 2–3 poll. longum, circa 2 lin. latum, glaucescens.

As all the specimens of this species from Aden are in leaf only, I have given Mr. Bentham's description in the 'London Journal of Botany,' vol. i. p. 501.

Ser. *Vulgares.*

§ *Dicanthæ.*

3. A. HAMULOSA (*Benth. in Lond. Journ. of Bot.* i. p. 509). Caule cinereo; ramulis rubescentibus; aculeis ternis, infrastipularibus rectis, infrapetiolari hamoso recurvo; petiolis aculeatis; pinnis 2–3-jugis, inferioribus suboppositis seu alternis; foliolis 3–6-jugis, oblique oblongis, obtusis, glabris; pedunculis axillaribus, demum folio longioribus; spicis laxis; legumine ovato, lineari, utrinque rotundato, mucronulato, indehiscente; valvis membranaceis, planis, glabris.

Hab. Aden, in vallibus (*Hook. fil. et T.*! *T. Anders.*).

Distr. Jeddah in Arabia Felici!

Frutex 8-pedalis, divaricatus, aculeis acutis horridus. *Aculei* veteres nigrescentes. *Folia* 1–1½ unc. longa. *Pedunculi* leguminiferi, 2½ unc. longi. *Legumen* 3½ unc. longum, 1½ unc. latum.

Ordo XV. CUCURBITACEÆ.

1. CUCUMIS, *Linn.*

1. C. PROPHETARUM (*Linn.* spec. 1436). Prostratus, albido-pruinosus, scaber; caulibus tetragonis, striatis, flagellatis; foliis plerisque 3–5 palmato-lobatis, rigidis, fragilibus; cirris simplicibus; floribus solitariis, axillaribus; peponibus ovoideis, muricatis.—*C. Arabicus*, Del. in Cat. Hort. Monsp.; *C. amarus*, Stocks in Herb. Hook.; *C. anguinus*, Forsk.? Descr. p. 168.

Hab. Aden, in locis arenosis (*Hook. fil. et T.*! *T. Anders.*).

Distr. In Arabia Petræa! Muscat! Scinde! Africa centrali! Ægypto!

Annuus? ramuli graciles, angulati, fragiles, albi, punctis scabris pruinosis reflexis. *Folia* polymorpha et magnitudine variabilia, ovata vel cordata, plerumque 3–5-lobata vel subintegra, subtus reticulato-venosa. *Peponis* pulpa amara.

2. CITRULLUS, *Neck.*

1. C. COLOCYNTHIS (*Arn. MSS. in Wight Icon.* t. 498). Caulibus longissime prostratis, angulatis, sulcatis, angulis tuberculis asperis scabris; cirris simplicibus, exaxillaribus; foliis multifido-dissectis, supra glabris, subtus tuberculis prominentibus hispidis, albidis; floribus femineis in ultimis flagellis, breviter pedunculatis, calyce hirsuto; peponibus globosis, glabris.—*Cucumis Colocynthis,* Linn.

Hab. Aden, secus littus (*T. Anders.*).

Distr. In Scinde! Punjab! Ceylania! Ægypto superiore! Algeria! Hispania! Senegambia! insulis Canariensibus! insulis Capitis Viridis!

Asper tuberculis hispidis; flagelli (ramuli) 1–4½ ped. longi, arenam adpressi. *Flores* conspicui, viridi-flavi. *Pepo* amarus.

Ordo XVI. PORTULACEÆ.

1. TRIANTHEMA, *Linn.*

1. T. CRYSTALLINA (*Vahl, Symb.* i. p. 32). Prostrata, diffusa, papulosa; caule fruticoso, tereti; foliis oppositis, spathulatis, ovalibus; floribus axillaribus, congestis; staminibus quinque; stylo uno; capsulis dispermis, operculo cyathiformi.—*T. triquetra,* Rottl.; *Papularia crystallina,* Forsk. Descr. p. 69.

Hab. Aden (*T. Anders.*).

Distr. In Arabia Felici! India orientali tota!

2. ORYGIA, *Forsk.*

1. O. DECUMBENS (*Forsk. Descr.* p. 103). Caule prostrato seu suberecto, tereti; foliis alternis, ovatis, acutis, petiolatis; petioli basi margine scariosa; racemis laxis, terminalibus, rarissime axillaribus; bracteis subulatis, scariosis, suboppositis; calyce 5-partito, persistente; petalis et staminibus plurimis; capsulis globosis, 5-valvis, polyspermis.—*Portulaca decumbens,* Vahl, Symb. i. p. 33. *Talinum decumbens,* Willd. Spec. ii. p. 864.

Hab. Aden, a littore ad altitudinem 1000 ped. in montem Jibeel Shumshum (*Edgew. Hook. fil.*!).

Distr. In Arabia Felici! Scinde! Pen. Ind. orient.!, Africa australi!

Fruticosa, decumbens. *Caulis* 3–10 unc. longus, glaber. *Folia* subfarinosa, 4 lin.–1 unc. longa, 2–6 lin. lata. *Sepala* acuta, marginibus scariosis. *Corolla* violacea.

Ordo XVII. UMBELLIFERÆ.

1. Ptychotis, *Koch.*

1. P. Arabica (*T. Anders.*). Puberula, caule erecto; foliis gracili-petiolatis, pinnatis vel bipinnatis; segmentis ternatis, profunde lobatis, lobis cuneatis, 3–4-fidis; radiis 5–8; involucris pentaphyllis, laciniis setaceis, subulatis, acutis; involucellis 3–5-phyllis; petalis minutis, squamæformibus, apice mucronatis, mucrone involuto; carpellis 5–7? costatis, costis glanduloso-hirsutis.

Hab. Aden, in cacumine montis Jibeel Shumshum (*Hook. fil.*!).

Herba pusilla, 2–4-uncialis. *Caulis* teres, pilis patentibus puberulus. *Folia* herbacea, subtomentosa seu glabra. *Flores* inconspicui, in siccis albi. *Fructus* maturus ignotus.

Ordo XVIII. RUBIACEÆ.

1. Oldenlandia, *Linn.*

1. O. Schimperi (*T. Anders.*). Caule adscendente vel subdecumbente, scabro-glanduloso; ramulis virgatis, sparse foliatis; foliis linearibus, acutis, margine revolutis, mucronatis, obscure glandulosis; stipulis membranaceis, setis 3, subulatis; cymis terminalibus; calycis segmentis brevibus; corollæ tubo longissimo, gracili; capsulis subglobosis, truncatis. — *Kohautia Schimperi*, Hochst. et Steud. in Pl. Schimp. n. 879; *Hedyotis* sp.?, Edgew. Journ. Soc. Asiat. Bengal. xvi. p. 1216.

Hab. Aden, in arenosis (*Edgew.*, *Madden*! *Hook. fil. et T.*! *T. Anders.*).

Distr. In Arabia Petræa! in regione Tehama Arabiæ Felicis! Muscat!

Perennis, 1–1½-pedalis, glabra seu scabrido-glandulosa. *Folia* 6–9 lin. longa, ½–1 lin. lata; *corollæ* tubus 5–6 lin. longus; limbus 3–4 lin. latus. *Corolla* fulva.

I agree with Mr. Bentham in following Asa Gray in uniting *Kohautia* with *Oldenlandia*, a genus distinguished from *Hedyotis* by the dehiscence; which is loculicidal in *Oldenlandia*, and septicidal in *Hedyotis*.

Ordo XIX. COMPOSITÆ.

Subordo Tubulifloræ.

1. Vernonia, *Schreb.*

1. V. atriplicifolia (*Jaub. et Spach, Ill. Pl. or.* t. 359). Suffruticosa, ramosa, pilis adpressis incana; foliis petiolatis, carnosis, infimis spathulatis, integerrimis, superioribus ovatis vel sublinearibus, cuneatis, rhomboideis, dentatis, rarissime bidentatis, subsessilibus; involucris

5-6-seriali-imbricatis, squamis omnibus inæqualibus, exterioribus subcoriaceis, acutis, subpuberulis; acheniis abbreviatis, truncatis, hirsutis; pappo biseriali, exteriore brevissimo, setis lanceolatis, interiore corollam æquante, setis albidis, aristatis.

Hab. Aden, a littore ad cacumen montis Jibeel Shumshum (*Edgew. Hook fil. et T.*! *T. Anders.*).

Distr. In Arabia Felici.

Suffrutex perennis. *Caulis* lignosus, 6-unc.–1-pedalis. *Involucrum* paulo variegatum, pallide violaceum. *Corolla* 1–2 lin. longa, violacea.

2. VARTHEMIA, *DC.*

1. V. ARABICA (*Boiss. Diag.* vi. p. 74). Suffruticosa, glanduloso-tomentosa, ramulis apice corymbosis; foliis lanceolatis, basi attenuatis, apice mucronulatis, integris, utrinque puberulis; pedunculis terminalibus, cymosis; involucri squamis lanceolatis, acutis, adpressis, exterioribus brevibus, subulatis; acheniis subhirsutis; pappo biseriali, setis externis brevissimis, rigidis, internis 15-barbatis.

Hab. Aden, prope mare (*Hook. fil.*).

Distr. In Muscat!

Species distincta. *Suffrutex* perennis, 8-unc.–1-pedalis, foliosus. *Folia* 1–1½ unc. longa, 1–2 lin. lata. *Corolla* flava. *Setæ* exteriores acheniis triplo breviores. *Achenium* ½ lin. longum.

De Candolle describes *Varthemia* as having the pappus uniserial; in five species that I have examined, in addition to the original species *V. Persica*, the pappus is in two rows, the outer consisting of short rigid setæ.

3. IPHIONA, *DC.*

1. I. SCABRA (*DC. in Ann. Sc. Nat.* sér. 2. ii. p. 263). Glandulosa, scabra, caule ramosissimo folioso; foliis lineari-lanceolatis, subpungenti-acutis, sæpissime integris, interdum dentatis; floribus corymbosis; involucris imbricatis, lineari-lanceolatis, membranaceis, glabris; acheniis sericeo-hirsutissimis, striatis; pappo multiseriali; setis aristoideis, barbatis.

Hab. Aden, frequentissime (*Madden*! *Hook. fil. et T.*! *T. Anders.*).

Distr. In Arabia Petræa! Muscat!

Species in forma foliorum variabilis. *Folia* in plerisque rigida, spinescentia, in nonnullis herbacea.

4. HOCHSTETTERIA, *DC.*

1. H. SCHIMPERI (*DC. Coll. Mem.* ix. t. 6). Caule erecto, striato, glabro, basi interdum gossypino-tomentoso; foliis ovatis, mucronatis, basi in petiolum attenuatis, obscure serratis, margine scabris; floribus 1–2 in terminalibus ramorum; involucris præmultis, lanceolatis, argute spinescentibus, apice serrato-barbatis, glabris, exterioribus demum re-

flexis; acheniis apice truncatis, basi attenuatis, hirsutissimis; pappo uniseriali, rigido.

Hab. Aden (*Hook. fil. et T.*!).

Distr. In Arabia Petræa! Scinde!

Herba annua? gossypino-tomentosa vel subglabra. *Caulis* striatus. *Folia* ½–1 unc. longa, 2–5 lin. lata; foliorum margo punctis asperis scabra. *Involucri* squamæ sub-3-costatæ. *Flores* aurantiaco-flavi.

Subordo LIGULIFLORÆ.

5. BRACHYRAMPHUS, *DC.*

1. B. LACTUCOIDES (*T. Anders.*). Glaber; caule adscendente, tereti, gracili; foliis radicalibus obovatis, runcinatis, obtusis, margine dentato-ciliatis; caulinibus amplexicaulibus, sagittatis, subtus glaucis; floribus paniculatis; paniculis laxis, multifloris, pedunculis gracilibus, filiformibus; bracteis minutis, scariosis; involucris imbricatis; squamis exterioribus parvis ovatis, margine scariosis, interioribus longe lineari-acuminatis; acheniis utrinque attenuatis, angulatis, tuberculatis, paulo adpressis; pappo pluriseriali, molliter piloso.—*Lactuca Massavensis*, C. H. Schultz in Schimp. Pl. Abyss. n. 1462.

Hab. Aden (*Hook. fil. et T.*!).

Distr. In Arabia Petræa? Beloochistan! Abyssinia!

The shape of the achenia and the sessile white and downy pappus remove this plant from *Lactuca*, with which Schultes associates it. Though it much resembles some of the other species of *Brachyramphus*, it can at once be distinguished from them by its slender-pedunculated flowers and loose panicles.

Subclassis III. **Corollifloræ.**

Ordo XX. APOCYNEÆ.

1. ADENIUM, *Rœm. et Sch.*

1. A. OBESUM (*Rœm. et Sch. Systema*, ii. p. 411). Fruticosum, caudice ramisque crassis; foliis ad apicem ramorum confertis, ellipticis, ovatis vel spathulatis, subpetiolatis, obscure mucronatis, integris, crassiusculis, eveniis, glabris, subtus glaucis; pedicellis solitariis vel geminis, subaxillaribus terminalibusve, villosis; floribus folio longioribus; calycis segmentis lanceolatis, villosis; corolla extus puberula, intus pubescente; limbi lobis rotundatis, obtusis.—*Nerium obesum*, Forsk. Descr. p. 205; *Pachypodium obesum*, G. Don, Syst. Gard. iv. p. 80. *Cameraria obesa*, Spreng. Syst. i. p. 641. *Adenium Hongel*, Bot. Reg. xxxii. t. 54, non DC. Prod. viii. p. 412.

Hab. Aden, in rupibus (*Hook. fil. et T.*! *T. Anders.*).

Distr. In Arabia Felici!

Frutex 1–3-pedalis, succo lacteo. *Caudex* globosus, crassus, carnosus, ambitu 1–2 ped. *Rami* teretes, crassi, aphylli, dichotomi. *Folia* et *flores* in apice ramorum. *Corolla* purpurea, 1½–2 unc. long.; limbus 1 unc. latus.

Ordo XXI. ASCLEPIADACEÆ.

1. Steinheilia, *Decaisne.*

1. S. radians (*Dcne. in Ann. Sc. Nat.* sér. 2. ix. p. 339) Incana, villosa, caule erecto; foliis subreniformibus, acutis, serratis, pulcherrime variegatis, petiolatis; pedunculis axillaribus, solitariis, multifloris; floribus umbellatis, pedicellis brevibus; calycibus 5-partitis, segmentis lanceolatis, incano-hirsutis; corolla calyce duplo longiore, glabra, limbo 5-fido, lobis erectis, lanceolatis, acutis, contortis, tubo 5 foveis instructo; folliculo ovoideo, villoso.—*Asclepias radians*, Forsk. Descr. p. 49.

Hab. Aden, rarissime, in arenosis (*T. Anders.*).

Distr. In Arabia Felici!

Herba perennis, odore mellis. *Folia* lurido-viridia, subtus violacea, 1 unc. longa, 1½ unc. lata; petiolus ½ unc. longus. *Pedunculus* tomentosus, 1–2 unc. longus. *Corolla* 5 lin. longa, violacea. *Folliculus* abortu solitarius, carnosus.

2. Glossonema, *Decaisne.*

1. G. Boveanum (*Dcne. in Ann. Sc. Nat.* sér. 2. ix. p. 335). Incanum, "foliis lanceolatis vel ovato-lanceolatis, sinuato-dentatis, crispis, utrinque pubescenti-incanis; coronæ squamis apice emarginatis, medio subulatis; folliculis ovatis, attenuatis, spinis innocuis instructis."—*Gomphocarpus pauciflorus*, Hochst. et Steud. in Pl. Schimp. n. 920.

Hab. Aden (*Edgew.*).

Distr. In Arabia Felici!

Herba perennis, incana. *Folia* opposita, linearia, lanceolata. *Pedunculi* extra-axillares. *Pedicelli* basi bracteolis setaceis instructi.

I have not seen Edgeworth's specimen from Aden, and have therefore adopted Decaisne's description, from the 'Annales des Sciences Naturelles,' and De Candolle's 'Prodromus,' vol. viii. p. 554.

Ordo XXII. CONVOLVULACEÆ.

1. Convolvulus, *Linn.*

1. C. glomeratus (*Chois., DC. Prod.* ix. p. 401). Caulibus præmultis, prostratis, teretibus, gracilibus, pilis adpresssis pubescentibus; foliis hastato-lanceolatis, acutis, mucronulatis, petiolatis; glomerulis axillaribus; pedunculis folio duplo longioribus; bracteis foliaceis, lanceolatis, villosis, calycem paulo superantibus; sepalis ovato-lanceolatis, fusco-villosis; corolla calyce longiore, glabra; capsulis globosis; semi-

nibus glabris, lævibus.—"*Convolvulus capitatus*, Vahl" in Schimp. Pl. n. 731 et 784, sed non *C. capitatus*, Vahl.

Hab. Aden (*Edgew.*, *Hook. fil. et T.* !).

Distr. Arabia Felici! Scinde! Abyssinia!

2. C. SERICOPHYLLUS (*T. Anders.*). Caule suberecto? ramulis strictis, sericeis, elongatis; foliis lanceolatis, acutis, basi in petiolum attenuatis, utrinque incano-sericeis; floribus axillaribus, breviter pedunculatis, solitariis, geminis ternisve; bracteis parvis, subulatis; sepalis ovatis, sericeo-pubescentibus, submembranaceis; corolla calyce duplo longiore, extus sericeo-hirsuta; capsula globosa, glabra.

Hab. Aden (*Hook. fil. et T.* !).

Suffrutex perennis, omnino incano-sericeus, 2-pedalis. *Caulis* et *ramuli* teretes, virgati. *Folia* 3 lin.–1 unc. longa, ½–2 lin. lata. *Pedunculus* 2 lin. longus. *Calyx* 1 lin. longus. *Corolla* 3 lin. longa.

Species *C. microphyllo* (Sieb.) proxima, sed calyce et corolla parvis sepalisque obtusis facile distinguenda.

2. CRESSA, *Linn.*

1. CRESSA LATIFOLIA (*T. Anders.*). Incano-tomentosa, pilis adpressis, caulibus et ramis subtortuosis, foliaceis; foliis ovatis, obtusis, integris, utrinque incano-tomentosis; floribus ad apicem ramulorum, axillaribus, solitariis, sessilibus; sepalis ovatis, acuminatis, tomentosis; corolla calyce vix longiore, extus hirsuta; staminibus inclusis; stylis paulo exsertis, ovariis hirsutis; capsula puberula; seminibus glabris.—*Seddera latifolia*, Hochst. et Steud. n. 884. *Breweria evolvuloides*, Chois. Convs. Or. p. 112. *Seddera evolvuloides*, Wight, Icon. t. 1369.

Hab. Aden, ad altitudinem 800 ped. in montem Jibeel Shumshum (*Hook. fil.*).

Distr. In Arabia Felici! Scinde! Pen. Ind. orient.! Abyssinia!

I can find no characters of sufficient importance to keep *Seddera* as a genus distinct from *Cressa*. The stamens, included in the dry specimens, are said not to be so in the living plant. Dr. Stocks, in a note on this species in the Hookerian herbarium, says that in the fresh plant the corolla is rolled back, so as to expose the stamens. Wight's figure (Icones, t. 1369) is merely a glabrous state of this species, which Choisy referred to *Breweria*.

Ordo XXIII. BORAGINEÆ.

1. HELIOTROPIUM, *Tourn.*

1. H. STRIGOSUM (*Willd. Sp.* i. p. 743). Fruticulosum, radice lignoso; caulibus erectis vel prostratis, ramosissimis, omnibus pilis adpressis strigosis, canescentibus; foliis ovatis-acutis vel linearibus, integris, margine revoluto, sessilibus; racemis terminalibus, laxis, elongatis, dissitifloris; floribus subsessilibus, solitariis; calycis segmentis ovatis, rotundatis, strigoso-pubescentibus; corolla extus pubescente, calyce

paulo longiore; nucibus rotundatis, hirsutis.—*Heliotropium brevifolium* et *H. tenue,* Wall. *H. tenuifolium,* R. Br. Prod. 494. *H. fruticosum,* Forsk. *H. parvifolium,* Edgew. in Journ. Asiat. Soc. Beng. xvi. p. 1216.

Hab. Aden, a littore usque ad cacumen montis Jibeel Shumshum (*Edgew., Hook. fil. et T.*! *T. Anders.*).

Distr. In regionibus tropicis orbis veteris, a Senegambia ad Siam, etiamque in regione tropica Australiæ.

Ordo XXIV. SOLANACEÆ.

1. LYCIUM, *Linn.*

1. L. EUROPÆUM (*Linn. Syst.* ii. p. 28, *et T. Anders. in Annal. Nat. Hist.*, ser. 2, xx. p. 126). Fruticosum, cortice albido vel purpureo; ramis spinescentibus, spinis teretibus; foliis 2–5, ad basin spinarum fasciculatis, obovato-oblongis vel oblongo-cuneatis; pedicellis e fasciculis foliorum interdum geminis, plerumque solitariis, unifloris, calyce longioribus; calyce breviter 5-dentato, glabro vel puberulo; corolla calyce duplo vel triplo longiore, anguste infundibuliformi, staminibus inclusis.—*L. salicifolium,* Mill. Dict. n. 3. *L. indicum,* Wight, Icon. t. 1403. *L. Mediterraneum,* Dun. in DC. Prod. xiii. p. 523. *L. Edgeworthii,* Dun. *l. c.* p. 525. *L. orientale,* Miers, *Ill. S. Amer. Pl.* p. 99. *L. Persicum,* Miers, *l. c.* p. 100.

Hab. Aden, secus littus (*Hook fil. et T.*! *T. Anders.*).

Distr. In regione Mediterranea Europæ et Africæ! insulis Canariensibus! Arabia Felici! Scinde! Punjab! Pen. Ind. orient.!

Folia punctulata, ½–1 unc. longa. *Spinæ* axillares, nudæ, vel foliola ¼–1 unc. longa. *Calyx* 5-dentatus, campanulatus, 1½ lin. longus, glaber, punctatus. *Filamenta* inclusa, inæqualia, uno cæteris breviore. *Corolla* 4–6 lin. longa, cæruleo-purpurea. *Bacca* globosa, glabra.

Ordo XXV. SCROPHULARINEÆ.

1. ANARRHINUM, *Desf.*

1. A. PEDICELLATUM (*T. Anders.*). Glabrum, suffruticosum, ramis virgatis, foliis linearibus, plerumque integris, acutis, crassiusculis, inferioribus interdum bidentatis; racemis laxissimis, dissitifloris, virgatis; pedunculis foliis longioribus, solitariis, unifloris; calycis segmentis ovato-lanceolatis, acutis, glabris, margine subscarioso; corolla calyce duplo longiori, ecalcarata, glabra; capsulis magnis, nutantibus; seminibus ovoideis, tuberculatis.

Hab. Aden (*Edgew.*? *Hook. fil. et T.*!).

Suffrutex glaber, 6-unc.–1½-pedalis. *Rami* graciles, virgati. *Folia* integerrima, rarissime bidentata, linearia, glabra.—*A. pubescenti* (Fresen.) accedit, sed ab eo differt glabritie, foliis omnibus linearibus, racemis dissitifloris, virgatis, pedicellis longioribus.

2. ANTICHARIS, *Endl.*

1. A. ARABICA (*Endl. Nov. Stirp. Decad.* p. 23). Erecta, glutinosa, foliis alternis, ovato- vel lineari-oblongis, obtusis, petiolatis, pubescenti-glutinosis; pedunculis axillaribus, unifloris, infra medium bibracteolatis; corolla tubulosa, fauce elongata, ampla; staminibus duobus, inclusis; capsulis ovatis, acuminatis, rostratis, bisulcis; seminibus numerosis, rugosis.—*Capraria Arabica*, Hochst. et Steud. Pl. Arab. un. iter, n. 748. *Meissarrhena tomentosa*, R. Br. in Salt, Abyss. app.

Hab. Aden (*Edgew. Hook. fil.* !).

Distr. In Arabia Felici! Scinde!

Herba annua, glutinosa, pubescens. *Caulis* teres, erectus, 4–9-unc. *Folia* 5 lin.–1 unc. longa, 1–3 lin. lata. *Pedunculus* 2–3 lin. longus. *Corolla* 4–5 lin. longa, glabra, venosa, cærulea. *Capsula* puberula, 2½–3 lin. longa.

3. LINDENBERGIA, *Lehm.*

1. L. SINAICA (*Benth. Scroph. Ind.* p. 22). Villosa, ramis erectis, divaricatis; foliis subrotundato-ovatis, petiolatis, grosse crenato-dentatis, floralibus subsessilibus; racemis elongatis, terminalibus, foliaceis; floribus oppositis, secundis; calyce campanulato; corolla calyce triplo longiore, labio superiore erecto, inferiore breviore; staminibus 4; capsula ovoidea, bisulca, pubescente.—*Bovea Sinaica*, Dcne. Ann. Sc. sér. 2. ii. p. 253.

Hab. Aden, in puteis veteribus (*Hook. fil. et T.*! *T. Anders.*).

Distr. In Arabia Petræa! et Felici!

Herba viscosa, villosa. *Caulis* perennis. *Folia* 4 lin.–1 unc. longa, 2–7 lin. lata. *Racemi* semipedales ad pedales; flores remoti vel rarissime conferti. *Calyx* folia floralia superans. *Corolla* 5–7 lin. longa, flava.

4. CAMPYLANTHUS, *Roth.*

1 C. JUNCEUS (*Edgew. in Journ. Asiat. Soc. Bengal*, xvi. p. 1217). Glaber, ramis elongatis, virgatis, subaphyllis; foliis linearibus, acutis, integerrimis, crassiusculis, caulinibus parvis subulatis; racemis elongatis, virgatis, terminalibus; floribus alternis, pedicellatis, secundis; pedicellis brevibus, basi bibracteatis, unifloris; calyce 5-partito, segmentis lanceolatis acutis; corolla calyce multo longiore, tubo elongato incurvo, limbo patente subæquali; staminibus duobus; antheris demum ad confluentia loculorum unilocularibus; seminibus numerosis, orbicularibus, compressis, marginatis.

Hab. Aden (*Edgew., Hook. fil. et T.*! *Madden*! *T. Anders.*).

Distr. In Scinde?

Suffrutex glaber, subglaucus, 1–3-pedalis. *Folia* inferiora, 1–2½ unc.

longa, 1–2 lin. lata, breviter petiolata. *Racemi* 6, semipedales ad pedales. *Pedicelli* 1–2 lin. longi. *Bracteæ* minute ciliatæ. Corollæ *tubus* 3 lin. longus; limbus 3 lin. latus; lobi ovati. *Corolla* flavo-albida.

Ordo XXVI. ACANTHACEÆ.

1. Blepharis, *Juss.*

1. B. Edulis (*Pers. Synops.* ii. p. 180). Subacaulis, ramis nullis vel divaricatis, prostratis suberectisve, plerumque pubescenti-velutinis vel hirsutis; foliis ovato-linearibus, grosse spinoso-dentatis; tuberculis piliferis, utrinque scabris; spicis columnaribus vel abbreviatis, quadrifariis; bracteis ovato-lanceolatis, spinoso-acuminatis, 5–7-nerviis, margine dentatis, 5–7 spinis; bracteolis linearibus, lanceolatis; calycis sepalis membranaceis, tomentosis, inferiore trinervi integra, superiore binervi bidentata, lateralibus subulatis uninerviis; capsulis glabris, dispermis; seminibus pilis adpressis, fusco-incanis.—*Acanthus Delilii,* Sp. Syst. iii. p. 819. *Acanthus pectinatus,* Willd. n. 11727. *Acanthus edulis,* Vahl, Symb. i. p. 48, et Forsk. Descr. p. 114. *Acanthodium spicatum,* Del. Fl. Ægypt. p. 97, t. 33. f. 3. *Ruellia ciliaris,* Linn. Mant. p. 89. *Ruellia Persica,* Burm. Pl. Ind. p. 135. *Acanthodium sinuatum*? *β. nanum,* Nees, DC. Prod. xi. p. 274. *Acanthus imbricatus,* Edgew. in Journ. Asiat. Soc. Beng. xvi. p. 1217.

Hab. Aden, in convallibus glareosis (*Edgew., Hook. fil. et T.*! *Madden*! *T. Anders.*).

Distr. In Arabia Petræa! littoribus Sinus Persici! Scinde! Ægypto superiore! Nubia!

Fruticulus perennis, horridus, subacaulis, sæpe spica sola constitutus. *Spicæ* 2–6 unc. longæ. *Bracteæ* rigide pungentes, 1½ unc. longæ. *Corolla* azureo-cærulea.

Ordo XXVII. VERBENACEÆ.

1. Bouchea, *Cham.*

1. B. marrubiifolia (*Schauer in DC. Prod.* xii. p. 558). Dichotoma, velutina, ramis teretibus; foliis ovatis petiolatis, serrato-dentatis, supra glabriusculis, subtus incano-velutinis, rugoso-reticulatis; spicis terminalibus, multifloris; bracteis lanceolato-subulatis, parvis; floribus alternis, sessilibus; calyce 5-angulato, plicato, 5-dentato; corolla calyce duplo longiore, hypocraterimorpha; staminibus 4, inclusis; capsulis calyce inclusis, dicoccis, coccis demum dissilientibus.—*Chascanum marrubiifolium,* Fenzl, in Kotschy, Pl. Nub. n. 32.

Hab. Aden, in locis depressis (*Hook. fil.*! *T. Anders.*).

Distr. In Scinde! Ægypto!

Ordo XXVIII. LABIATÆ.

1. Lavandula, *Linn.*

1. L. setifera (*T. Anders.*). Glabra, caulibus subaphyllis, subtetragonis, fere 6-costato-striatis; foliis pinnatis, segmentis linearibus, integris vel dentatis, crassiusculis; bracteis (foliis floralibus) alternis, unifloris, membranaceis, basi dilatatis, longe setaceis, calyce duplo longioribus; spicis terminalibus, simplicibus, densis; calyce 15-nervio, 5-dentato, velutino.

Hab. Aden (*Hook. fil. et T.*).

Subherbacea. *Caules* virgati, subnudi, glabri, semipedales. *Folia* pilis sparsissimis glabriuscula. *Spicæ* 1–1½ unc. longæ, velutinæ. *Calyx* 2 lin. longus. Corollam non vidi.

Ordo XXIX. PLUMBAGINEÆ.

1. Statice, *Willd.*

1. S. axillaris (*Forsk. Descr.* p. 58). Fruticosa, glabra, caulibus divaricatis, foliosis; foliis oblongo- vel lanceolato-spathulatis, acutiusculis, carnosis, glaucis, in petiolum attenuatis; petiolo basi fusco, caulem vaginante; scapis axillaribus vel subterminalibus, paniculatis, paulo angulatis; floribus confertis; spicis breviusculis, secundis, spiculis 2–3-floris; bracteis persistentibus, coriaceis, fuscis, margine subalbido, superiore involuta enervi obtusa, inferioribus triplo majore; calyce infundibuliformi, basi hispido, persistente, 5-costato, limbo hyalino, lobis obtusis.—*S. Bovei*, Jaub. et Spach, Ill. Pl. Or. i. t. 86. *S. lanceolata*, Edgew. Journ. Asiat. Soc. Beng. xvi. p. 1218.

Hab. Aden. in littore, etiam in cacumine montis Jibeel Shumshum (*Edgew., Hook. fil. et T. Madden, T. Anders.*).

Distr. In littoribus Arabicis Maris Rubri!

Species distincta sed *S. Arabicæ* et *S. Stocksii* affinis, ab eis differt forma foliorum et petiolorum, paniculis, bracteis calycibusque.

Ordo XXX. SALVADORACEÆ.

1. Salvadora, *Linn.*

1. S. Persica (*Linn. Spec. Plant.* vol. i. p. 122). Adscendens, cortice glauco; foliis oppositis, petiolatis, ovatis, lineari-lanceolatis, acutis, mucronulatis, eveniis, subcarnosis, glaucis; stipulis inconspicuis; paniculis in ultimis ramorum, oppositis, folia superantibus, multifloris; floribus in ramulis paniculæ sessilibus; calyce 4-partito, segmentis ovatis, obtusis; corolla calyce paulo longiore, membranacea, profunde 4-fida; lobis ovatis, apice rotundatis, concavis; staminibus quatuor, corollæ lobis alternis; stylo abbreviato, incrassato; bacca globosa, gla-

bra, calyce corollaque persistentibus basi cincta.—*S. paniculata*, Zuccar. *S. crassinervia*, Hochst. in Schimp. Pl. Abyss. n. 2218.

Hab. Aden (*Edgew.*, *Hook. fil. et T.*! *T. Anders.*).

Distr. In Arabia Petræa! Scinde! Abyssinia! Ægypto! Africa centrali!

Arbuscula divaricata, glauca, 2–6-pedalis. *Folia* coriacea, 1½–4 unc. longa, 5 lin.–1 unc. lata; petiolus 2–4 lin. longus. *Bacca* matura rubra! magnitudinis pisi parvi.

This plant is the original species on which Linnæus's genus was founded. Roxburgh in his 'Coromandel Plants,' p. 26, tab. 26, referred the common Indian species (*S. indica* of Wight's 'Icones') to *S. persica*, Linn., from which, however, it is quite distinct.

Salvadora Persica, L., is found in India only in Scinde, and perhaps in the Punjab. The *Salvadora Indica* and *Stocksii* of Wight (*L. Persica*, Roxb., non Linn.) is distinguished from *L. Persica*, Linn., by its distinctly pedicellated flowers, broader, always ovate leaves, and darker, scarcely glabrous appearance; it also grows to a much larger size. It is extensively distributed over India and Ceylon.

A third species (*Salvadora oleoides*, Decaisne, in Jacquemont, Voy. Botanique, p. 139, tab. 144), found only in the plains of North-Western India from Delhi to the Indus, is readily distinguished from the preceding species by its virgate elongated racemes with very short spikelets, and always narrow-linear-lanceolate, subsessile, thickly coriaceous leaves. This is evidently the *S. indica*, of Royle's Ill. p. 319, of which, however, there is no detailed description, and the *S. Persica* of Wight's 'Icones,' tab. 1621 A. It forms a spreading subglaucous bush, from three to six feet high. It is the "Puloo" of the inhabitants of the Punjab.

Subclassis IV. **Monochlamydeæ.**

Ordo XXXI. PHYTOLACCACEÆ.

1. Limeum, *Linn.*

Sect. *Limeastrum.*

1. L. Indicum (*Stocks, MSS. in herb. Hook.*). Caulibus diffusis, subprostratis, junioribus pubescentibus; foliis oppositis, petiolatis, ovalibus, rotundatis, acutis, mucronulatis, integris; petiolis basi scariosis, vaginantibus; cymis simplicibus axillaribus, confertis, bracteatis, foliis brevioribus, 4–10-floris; petalis unguiculatis, apice truncato-dentatis; calycis segmentis ovatis, acutis, margine scariosis; staminibus 6–7, petalis alternis; stylis binis; coccis duobus, glabris, monospermis.

Hab. Aden, in locis depressis prope mare (*Hook. fil.*!).

Distr. In Scinde! Nubia!

Herba glabra vel puberulo-viscidula. *Radix* perennis. *Caules* 4-unciales-1-pedales, teretes. *Folia* 2–5 lin. longa, 1–3 lin. lata; petiolus 1–2 lin. longus.

Ordo XXXII. SALSOLACEÆ.

1. Traganum, *Delile.*

1. T. nudatum (*Delil. Fl. Ægypt. Ill.* p. 57). Suffruticosum, ramulis alternis, tortuosis, teretibus, albis; foliis alternis, oblongo-triquetris vel teretibus, brevibus, incrassatis, basi dilatatis, mucronatis, glabris, glaucis; floribus solitariis vel 2–3 confertis; Calyce 5-fido, segmentis lanceolatis obtusis mucronatis, basi pilis floccosis apteris; staminibus 5, exsertis; filamentis compressis, deflexis; antheris sagittatis; stylis duobus; utriculo depresso, calyce indurato occulto.

Hab. Aden, secus littus (*T. Anders.*).

Distr. In Arabia Petræa! Ægypto! Algeria! insulis Canariensibus!

Suffrutex salsoloides. *Rami* divaricati, arenam marinam adpressi. *Folia* crassa, carnosa, brevia, sæpe late subulata, subpungenti-mucronata, succo aqueo plena.

Ordo XXXIII. AMARANTACEÆ.

1. Ærva, *Forsk.*

1. Æ. Javanica (*Juss. Anns. Mus.* xi. p. 131). Caule herbaceo, inferne suffruticoso, ramoso, erecto, tereti, albido-tomentoso; foliis alternis, subsessilibus vel petiolatis, ovatis, oblongo-lanceolatis vel obovatis, superne eveniis, subtus venosis, utrinque incano-tomentosis; paniculis terminalibus, aphyllis, adscendentibus, plerumque elongatis, interdum abbreviatis; spicis alternis, sessilibus, cylindricis, flexuosis, albo-lanatis; floribus densissime confertis; bracteis membranaceis, glabris, ovatis, acutis; sepalis 5, obovato-lanceolatis, obtusis, tenuibus, lanatis; floribus raro hermaphroditis vel staminiferis, plerumque pistilliferis; stigmatibus 2–3; utriculo subrotundo; calyce incluso, monospermo.—*Celosia lanata*, Linn. Spec. p. 298. *Iresine Javanica*, Burm. Fl. Ind. p. 212. *Illecebrum Javanicum*, Ait. Hort. Kew., ed. 1, i. p. 289. *Ærva tomentosa*, Forsk. Fl. Arabico-Yemen. n. 584, et Descr. p. 170. *Æ. Ægyptiaca*, Gmel. Syst. Nat. p. 1026. *Æ. incana*, Mart. in Nov. Acad. Nat. Cur. xii. p. 291. *Achyranthes alopecuroides*, Lam. Dict. i. p. 548. *A. Javanica*, Pers. Synops. i. p. 269. *A. incana*, Roxb. Fl. Ind., ed. 1832, i. p. 671.

Hab. Aden, locis depressis in convallibus, et in monte Jibeel Shumshum (*Hook. fil. et T.*! *Madden*!).

Distr. In toto orbe veteri calido ab insulis Capitis Viridis usque ad Javam.

Perennis, 1–2-ped., albido-tomentosa, tomento floccoso. *Folia* forma variabilia, 5 lin.–2 unc. longa, 2–8 lin. lata. *Petiolus* semiuncialis aut nullus. *Paniculæ* 3–8 unc. longæ, graciles vel congestæ. *Spicæ* conglomeratæ vel laxæ, 2 unc. longæ.

2. Saltia, *R. Br.*

S. papposa (*Moq. in DC. Prod.* xiii. pars 2. p. 325). Suffruticosa, cinerea, caule erecto, subtereti, pauce ramoso, cortice cinereo; ramis patulis, cortice viridi, puberulis; foliis alternis, subsessilibus, infimis in petiolum brevissimum attenuatis, linearibus, acutis, mucronulatis, crassiusculis, enerviis, glabris, glaucis; spicis brevibus, angustis, in ramis terminalibus; floribus approximatis, 2–3-bracteatis; bracteis parvis, una persistente, carinatis, mucronatis, villosulis; sepalis 5, exterioribus duobus altera paulo superantibus, ovatis, concavis, acutis, 4-nerviis, villosis, interioribus 3-nerviis; staminibus 5; filamentis subulatis, compressis, basi dilatatis atque in cupulam connatis; antheris bilocularibus, ovatis; stylo simplici, tereti, staminibus fere duplo longiore; stigmate capitato, globoso, integro; ovario ovoideo, glabro, uniovulato.—*Achyranthes papposa,* Forsk. MSS.

Hab. Aden, in solo arenoso (*Hook. fil.* ! *T. Anders.*).

Distr. In Arabia Felici.

Some confusion has occurred in the synonomy of this plant. Moquin-Tandon, in De Candolle's 'Prodromus,' has cited Schimper's number 977 as referring to *Saltia papposa.* In the Hookerian Herbarium this number is attached to a species of Convolvulaceæ, *Seddera intermedia,* Hochst. et Steudel (*Cressa* mihi), and, as such, is also quoted by Choisy in the 9th volume of the 'Prodromus,' p. 440. Fearing some mistake in the ticket, I wrote to M. Spach; and he kindly examined Schimper's number 977 in the Paris Herbarium, the specimen seen both by Choisy and Moquin-Tandon. He assures me that it is a true *Seddera.* M. Spach, in addition, corrects an important error in the habitat of M. Botta's specimens of *Saltia papposa* as recorded by Moquin-Tandon. M. Botta did not obtain his specimens at Mount Sinai, but in Arabia Felix—according to his ticket, in "Yemen, environs de Hamara et de Haïs."

Tab. III. Fig. 1, young state of flower; 2, matured fruit and two sterile flowers; 3, single bristle from a sterile flower; 4, one of the five sepals, with stamens and ovary; 5, showing relative position of stamens and ovary; 6, mature fruit, with the persistent stamens at the base. All are magnified.

Ordo XXXIV. PARONYCHIACEÆ.

1. Cometes, *Burm.*

C. Abyssinica (*R. Br. in Wall. Pl. As. Rar.* i. p. 18). Caule erecto, ramoso; foliis oppositis, sæpe uncinato-verticillatis, linearibus, lanceolatis, breviter petiolatis; stipulis scariosis, minutis, subulato-acutis; pedunculis in ultimis ramulis, axillaribus, floribus 3–4; bracteis oppositis, pungentibus, reflexis, villosis, demum aristis pinnatis; calycibus 5-partitis; segmentis marginibus membranaceis, apice fimbriato-ciliatis, duobus exterioribus concavis, pungenti-apiculatis; corolla (vel stamina abortiva) 5-loba; petalis basi in urceolum connatis; staminibus 5, petalis alternis, basi corollæ adnatis; stylo filiformi, simplici; stigmatibus 3, ovariis unilocularibus, utriculo monospermo. —*C. apiculata,* Decaisne in Ann. Sc. Nat. sér. 2. ii. p. 244. *Ceratonychia nidus,* Edgew. in Jour. Asiat. Soc. Beng. xvi. p. 1215.

Hab. Aden (*Edgew., Hook. fil.* !).

Distr. In Arabia Petræa! Muscat! secus littus Sinus Persici! Scinde!

Ordo XXXV. NYCTAGINEÆ.

1. Boerhaavia, *Linn.*

† *Flores paniculati.*

1. B. elegans (*Chois. DC. Prod.* xiii. part. 2. p. 453). Caule erecto, basi fruticoso, albido-puberulo; foliis ovatis lanceolatis vel linearibus acutis mucronatis, margine sinuatis, infimis petiolatis, superioribus sessilibus; paniculis terminalibus laxissimis, ramosis; pedicellis filiformibus, gracilibus; bracteis inconspicuis, oppositis, tomentosis, bracteolis duabus subpersistentibus; perigonio infundibuliformi, paulo inflato, limbo contracto plicato dentato; staminibus 3, inclusis; stylo uno, stigmate capitato-peltato; fructu ovato-clavato, tereti, obtuse 5 costatis, costis eglandulosis, sulcis pilis adpressis sparse puberulis.—*B. rubicunda,* Steud. Nom. p. 213.

Hab. Aden, ubique (*Edgew., Hook. fil. et T* !).

Distr. In Arabia Felici! Beloochistan! Scinde!

Suffrutex 1–3 ped., glaucus, puberulus. *Caulis* teres, obscure striatus. *Folia* superne viridia, puberula, subtus glaucescentia, rugosa, ½–1½ unc. longa, 3 lin.–1½ unc. lata; petiolus ½ unc. longus. *Perigonii limbus* glaber, 1½ lin. longus. *Fructus* pyriformis, 2 lin. longus; pericarpum in aqua mucilagineum.

†† *Flores umbellati.*

2. B. scandens (*Linn., Sp. Pl.* ed. 3. p. 14). Suffruticosa, caule diffuse prostrato, elongato, glabro; foliis oppositis, petiolatis, rotundato-ovatis, acuminatis, cordatis, margine repandis, utrinque glabris; umbellis in ramis terminalibus; pedunculis axillaribus 3–7-floris; perigonio tubo subinflato, limbo late infundibuliformi; staminibus 3, exsertis, stylo brevioribus; stylo brevi, stigmate capitato; fructu clavato, truncato, ecostato, apice glanduloso, muricato, pilis strigosis hirtello.—*B. dichotoma,* Vahl, En. i. p. 290. *B. repanda,* Willd. Sp. i. p. 22. *B. scandens,* Forsk. Descr. p. 3. *Valeriana scandens,* Forsk. Descr. p. 12. *B. plumbaginea,* Cav. Ic. ii. p. 7. *B. Burchelli,* Chois. DC. Prod. xiii. part. 2. p. 455. *B. verticellata,* Poir. Dict. v. p. 56. *B. grandiflora,* Rich. Hohen. in Schimp. Pl. Abyss. n. 2309. *B. stellata,* Wight, Icon. t. 875.

Hab. Aden (*Hook. fil.* ! *T. Anders.*).

Distr. In Asia tropica! Africa boreali usque ad Cap. Bon. Spei! Hispania! America tropicali, boreali, et australi! Australia! Insulis Galapagos!

This is an exceedingly variable plant; but even in its most aberrant forms the characters of the umbellate inflorescence, exserted stamens and style, and the elongated, clavate, ecostate, glandular fruit, can always be recognized.

Ordo XXXVI. EUPHORBIACEÆ.

1. Euphorbia, *Linn.*

Sect. *Anisophyllum.*

1. E. ÆGYPTIACA (*Boiss. in Cent. Euph.* p. 13). Caulibus prostratis, teretibus; foliis oppositis, inæqualibus, integerrimis, ovato- vel lineari-oblongis, obtusis, crassiusculis, pilis strigosis hirsutis; floribus axillaribus, solitariis vel 2–3, brevissime pedunculatis; involucro hirsuto, glandulis 5 glabris, dentibus 5, glandulis alternis, ciliatis, hirsutis; ovario stipitato, incano, hirsutissimo, stipite pubescente; stylis non coalitis; seminibus rubescentibus, demum albidis, transversim rugosis. —*E. Forskålii*, Gay in Phyt. Canar. iii. p. 240. *E. arillata*, Edgew. in Journ. Asiat. Soc. Bengal. xvi. p. 1218.

Hab. Aden (*Edgew.*, *Hook. fil.*! *T. Anders.*).

Distr. In Arabia Felici! India boreal.-occid.!

Herba pusilla. *Caules* strigosi, hirsuti, fragiles, 3–6 unc. longi. *Folia* pilis adpressis subincana, 2 lin. longa, $\frac{1}{2}$–1 lin. lata. *Flores* et *capsulæ* minuti, hirsutissimi.

The plant from Aden is so small and strigosely hirsute, with leaves not at all serrated, that it seems almost distinct enough to be ranked as a variety. Judging from his description, Edgeworth seems to have found the normal state of the species.

2. E. ARABICA (*Hochst. et Steud. in Pl. Schimp.* n. 756). Erecta, glaberrima; caule tereti ramoso; foliis oppositis, strictis, inæqualibus lineari-lanceolatis vel ovato-lanceolatis, mucronatis, glabris; stipulis angustissime lanceolatis; floribus axillaribus, plerisque solitariis; pedunculo glabro brevi; involucro pyriformi, glabro, dentibus ovatis, fimbriato-ciliatis, glandulis rotundis, intus basi ciliatis; ovario et stipite glabris; stylis divaricatis, ad basin liberis; stigmatibus bifidis; capsula angulata; seminibus lævibus, flavo-rubris.

Hab. Aden, prope mare (*Hook fil. et T.*!).

Distr. In Arabia Felici, in Tehama!

Suffrutex perennis, 4-uncialis, 1-pedalis. *Caulis* lignosus. *Folia* remota vel confertim approximata, 2 lin.–1 unc. longa, 1 lin. lata.

Sect. *Carnosæ et Arboreæ.*

† *Aphyllæ.*

3. E. SCHIMPERI (*Presl. Bemerk.*). Fruticosa; ramis erectis, teretibus, carnosis, trichotomis; foliis deciduis, 1–3, in ultimis ramulis, minutis,

ovatis, acutis, integris; pedunculis terminalibus, brevibus, teretibus, crassis, carnosis, 4-floris; floribus breviter pedicellatis, umbellatis, bibracteatis; bracteis ovatis acutis, basi truncatis, subherbaceis, integerrimis; involucris campanulatis; glandulis 5, concavis; dentibus obtusis, fimbriatis, glandulis brevioribus; staminibus 20, nonnullis exsertis; ovario stipitato, glabro; stylis infra medium coalitis; stigmatibus incrassatis, bifidis.

Hab. Aden (*Hook. fil.*! *T. Anders.*).

Distr. In Arabia Felici!

Frutex aphyllus, carnosus, pallide viridis. *Rami* patuli. *Folia* rarissime adsunt, 3–5 lin. longa, 2 lin. lata, herbacea, glabra. *Pedunculi* 4–5, in apice ramorum umbellato-conferti, 3 lin. longi. *Involucrum* viride; glandulæ et antheræ flavæ.

†† *Superne foliatæ v. foliosæ.*

4. E. CUNEATA (*Vahl, Symb.* ii. p. 53). Caule lignoso, cortice cinereo-glabro, ramis rectangularibus, spinescentibus, pauce foliatis; foliis in tuberculis fasciculatis, cuneato-oblongis, cuneato-ovatis vel linearibus, apice obtusis vel obscure bilobatis, basi attenuatis, sessilibus, interdum petiolatis, utrinque tomentellis; pedunculis e tuberculis foliiferis, 3–4-bracteatis, 4-floris; floribus umbellatis, 1 centrali, sessili, 3 pedicellatis; pedicellis pedunculo æquantibus sed gracilioribus; involucro campanulato, tomentoso; dentibus 5, cuneiformibus, fimbriatis; glandulis 5, concavo-peltatis, glabris; staminibus numerosis; ovario stipitato, tomentoso; stylis ad medium connatis, apice subintegris.—*E. fruticosa*, Edgew. in Journ. Asiat. Soc. Beng. xvi. p. 1219.

Hab. Aden (*Edgew.*, *Hook. fil.*! *Madden*! *T. Anders.*).

Distr. In Arabia Felici!

Arbuscula 6–10 pedalis, glabra. *Folia* et *flores* partesque juniores puberuli. *Folia* 2–8 lin. longa, 1–3 lin. lata. *Pedunculus* carnosus, teres, puberulus. *Involucrum* viride; glandulæ flavæ.

Descr. of Tab. IV. Fig. 1, leaf; 2, entire flower; 3, longitudinal section of same; 4, scale on petal of the male floret; 5, stamen. All the figures are magnified.

Sect. *Trithymalus.*

5. E. SYSTYLA (*Edgew. in Journ. Asiat. Soc. Beng.* xvi. p. 1218). Erecta, dichotoma; ramis angulosis, adscendentibus; foliis alternis, valde petiolatis, lanceolatis, lineari-lanceolatis, integris, mucronatis, puberulis; floribus axillaribus solitariis, sessilibus; involucro tubuloso, persistente, 4-dentato, dentibus fimbriatis, glandulis 4 concavis alternis; ovario pubescenti, stipite incrassato, tomentoso, stylis ad apicem coalitis, stigmatibus bifidis. Capsula erecta, subglobosa, puberula; coccis bisulcis, angulatis, angulis rotundatis; seminibus conicis, compressis, constrictis, testa crustacea, punctata, olivacea.

Hab. Aden, a littore usque ad altitudinem 1000 ped. in monte Jibeel Shumshum (*Edgew.*, *Hook. fil. et T.*! *Madden*!).

Suffrutex 2–3-pedalis. *Caulis* dichotomus, striatus, subglaucus, plus minus foliatus. *Folia* puberula, ½–1½ unc. longa, 1–3 lin. lata; petiolus 6 lin. longus.

Descr. of Tab. V. Fig. 1, entire flower; 2, longitudinal section of same; 3, petal and stamen of a male floret; 4, mature fruit; 5, ripe seed. All the figures are more or less magnified.

2. CROZOPHORA, *Neck.*

1. C. OBLONGIFOLIA (*Ad. Juss., Spr. Syst.* iii. p. 850). Suffruticosa; caule suberecto, floccoso, tomentoso; ramis dichotomis, foliosis; foliis petiolatis, subpeltatis, oblongis, lanceolatis, acutis, dentatis, dense stellato-floccosis, basi biglandulosis; racemis abbreviatis, in ramis terminalibus; floribus bracteatis, breviter pedicellatis, monoicis; floribus masculinis calyce 5-partito stellato tomentoso, petalis 5 glabris, staminibus 8–10, filamentis subcoalitis; femineis calyce 10-partito, corolla nulla, ovario sessili, capsula globosa tricocca stellato-glandulosa, seminibus rugosis.—*Croton oblongifolium,* Del. Ægyp. tab. 51. f. 1.

Hab. Aden (*Hook. fil. et T.*!).

Distr. In Arabia Felici et Petræa! Muscat! Scinde! Ægypto!

3. JATROPHA, *Linn.*

1. J. SPINOSA (*Vahl, Symb.* i. p. 79). Fruticosa, erecta; ramis teretibus, incrassatis; cortice cinereo-glauco vel purpurascente; foliis alternis, petiolatis, rotundatis, 5–7-nerviis, 3–5-lobatis vel obscure 7-lobatis, lobis oblongis, obtusis, obscure dentatis, utrinque glabris; stipulis pungenter spinosis, subpersistentibus; corymbis pedunculis elongatis, terminalibus, dichotomis, multifloris; bracteis parvis, basi dilatatis, acutis, scariosis; floribus subsessilibus, monoicis; calyce 5-partito, petalis 5; staminibus 8; ovario sessili; stylis convolutis, 3, liberis, stigmatibus peltatis; capsulis rugosulis, lignosis, tricoccis, coccis monospermis.—*Croton spinosum,* Forsk. Descr. p. 163.

Hab. Aden (*Hook. fil. et T.*! *T. Anders.*).

Distr. In Arabia Felici.

Arbuscula 7–8-pedalis, succo lacteo. *Caulis* aculeatus, rami incrassato-carnosi. *Folia* 1½ unc. longa, 1½–2 unc. lata; petiolus 1–1¼ unc. longus; stipulæ aculeatæ, nigræ vel glaucæ, 3 lin. longæ. *Corymbi* 4–5 unc. longi. *Flores* flavescentes, plurimi subsessiles, feminei paucissimi, in dichotomia corymborum sessiles.

Descr. of Tab. VI. Fig. 1, entire male flower; 2, same laid open; 3, female flower; 4, same with the floral envelopes removed.

Ordo XXXVII. URTICACEÆ.

1. FORSKOHLEA, *Linn.*

1. F. TENACISSIMA (*Linn. Mant.* p. 72). Suffruticosa; caule et ramis aculeato-asperis; foliis petiolatis, orbicularibus, ovatis vel rhomboideis,

grosse serratis, utrinque scaberrimis, superne subviridibus, subtus dense incano-tomentosis, nerviis subglabris, viridibus; capitulis axillaribus, sessilibus, geminis vel quaternis, 4–5-foliolatis, foliolis lanceolatis vel rotundatis, acutis, albidis, ciliatis, pilosis.—*Caidbeja adhærens,* Forsk. Descr. p. 82.

Hab. Aden, rarissime, in locis depressis (*Hook. fil.* !).

Distr. In Arabia Felici! et Petræa! in oris Sinus Persici! India boreal. occid!. Ægypto! Algeria! Hispania!

Herba 1–2-pedalis asperrima. *Caulis* lignosus, ramosus. *Folia* ½–1 unc. longa, ½ unc. lata; petiolus 4 lin. longus. *Capitula* petiolum æquantia; cilia involucri viridescentia.

Ordo XXXVIII. GNETACEÆ.

1. Ephedra, *Tourn.*

1. E. foliata (*Boiss. in Kotsch. Pl. Pers. Aust. et Diag. Pl. Or.* vii. p. 100). Fruticosa; caule striato, ramis angulatis, ramulis verticellato-fasciculatis, teretibus, puberulis, junceis, elongatis, ramosis remote articulatis; foliis quaternis, teretibus, subulatis, elongatis, mucronatis, basi membrana, caule vaginante connatis; spicis masculinis lateralibus vel ad apicem ramulorum aggregatis, subsessilibus; staminibus 3; floribus femineis 3–9, in ramulis trichotomis terminalibus pedicellatis, involucris margine scarioso-ciliato.—*E. ciliata,* Fisch. et Mey. in Meyer, Monog. Gener. Ephedræ, p. 100.

Suffrutex 2–3-pedalis, gracilis. *Caulis* subglaucus, striatus; ramuli floriferi 2–4 unc. longi, subtetragoni, sulcato-striati, fasciculati. *Folia* 8–10 lin. longa, superiora sæpe bina. *Spiculæ* masculinæ 3–4 lin. longæ, multifloræ.

Hab. Aden (*Hook. fil. et T.* !).

Distr. In Persia! Affghanistan! India boreal.-occid.!

Classis II. MONOCOTYLEDONES.

Ordo XXXIX. AMARYLLIDEÆ.

1. Pancratium, *Linn.*

1. P. tortuosum (*Herbt. in Herb. Hook.*). Bulbo ovato; foliis linearibus, attenuatis, acutis, viridibus, canaliculatis; scapo brevi, non subterraneo; spatha breviter pedunculata vel subsessili, membranacea, bifida, triflora; perigonii tubo gracili, limbo quadruplo longiore, limbi laciniis linearibus, acutis, coronæ, ultra medium liberis, dentibus acute triangularibus; stylo et filamentis coronam superantibus.—*P. tortifolium,* Boiss. Diag. Pl. Orient. xiii. p. 18.

Hab. Aden, in convallibus saxosis (*T. Anders.*).

Distr. In Arabia Felici, prope urbem "Jeddah"!

Folia sæpe tortula, 6–10 unc. longa, 3 lin. lata. *Scapus* 2 unc. longus.

Spatha 2½ unc. longa. *Perigonium* album, tubo incluso 5–7 unc. longum.

My plant, though not in flower, is doubtless the same as Herbert's species. It grows in clumps in one or two of the narrow valleys in Aden. Boissier quotes Schimper's number as 676; but the plant in the Hookerian herbarium is marked 876. My description is drawn partly from my own specimens and partly from the MS. diagnosis of Herbert in the Hookerian herbarium.

Ordo XL. CYPERACEÆ.

1. Cyperus, *Linn.*

1. C. conglomeratus (*Rottb. Gram.* t. 15. fig. 7). Glaucescens; radice fibroso, tomentoso, culmis erectis e denso foliorum cæspite plurimis, rare solitariis, striatis, obtuse triquetris; foliis erectis, rigidis, subteretibus, canaliculatis, mucronulatis, margine scabridis, basi culmis vaginantibus, purpurascentibus; involucro 3–4-phyllo, inæquali; foliolis 2, capitulum superantibus, uno inferiore, altero longiore; umbellis in apice culmorum capitatis, solitariis, subsessilibus, vel plurimis inæqualiter pedunculatis, radiatis; spiculis 5–20, sessilibus, oblongis, obtusis, compressis, imbricatis, multifloris; squamis ovatis, obtusis, plurimi-nerviis, carinatis; stylo trifido.

Hab. Aden, in locis depressis prope littus (*Hook. fil. et T.*! *T. Anders.*).

Distr. In Arabia Felici ! et Petræa ! oris Sinus Persici ! Ægypto ! Algeria !

Planta magnitudine variabilis, plerumque pedalis, sed marcescentia 2–3-uncialis; radicibus exceptis, glaberrima. *Folia* culmos non superantia; involucri foliolum foliis longius, 3-4 unc. longum, radii ½–1½ unc. longi.

Edgeworth does not enumerate this species among the plants found by him at Aden, but records *Cyperus effusus* and *Jeminicus*, Rottb., neither of which occurs in any of the Aden collections that I have examined.

Ordo XLI. GRAMINEÆ.

Tribus Paniceæ.

1. Tricholæna, *Schrad.*

1. T. Teneriffæ (*Parlat. in Webb, Phyt. Can.* iii. 425). Caule basi plus minus repente, ramoso, pubescente, demum adscendente, foliato, nodis vaginisque tomentellis; ligula pubescente, ciliata; foliis marginibus involutis, abbreviatis, apice attenuatis, mucronato-acutis; paniculis laxis, nodis pilosis, spicis compositis ternatis, multifloris, pedicellis ramosis, filiformibus, flexuosis, apice incrassatis; spiculis solitariis, bifloris, sericeo-pilosis, pilis gluma duplo longioribus; gluma exteriore nulla, interioribus 2-nerviis, obtusis, dorso ciliatis; flore masculino uno, palea binervis, apice obtusa, ciliato-dentata; staminibus 3; stylis attenuatis, apice barbatis; achenio nigrescente.—*Panicum Teneriffæ*, R. Br. in Prod. i. p. 39; *Saccharum Teneriffæ*, Linn. fil. in Suppl. p. 106;

Tricholæna micrantha, Schrad. in Rœm. et Schult. Syst. Veg. Mant. ii. p. 163; *T. leucantha*, Hochst. in Schimp. Pl. Abyss. n. 1818; *Saccharum*? *dissitiflorum*, Edgew. Journ. Asiat. Soc. Beng. xvi. p. 1219.

Hab. Aden (*Edgew.*, *Hook. fil. et T.*!).

Distr. In insulis Capitis Viridis! et insulis Canariensibus! oris Africæ borealis! et in insula Sicilia! Abyssinia! a peninsula Arabiæ usque ad Scinde!

2. PANICUM, *Linn.*

1. P. VIRIDE (*Linn.*, *Sp. Pl. Willd.*, i. p. 335). Radice fibroso, glabro; culmo basi decumbente vel erecto, ligulis ciliatis; foliis lanceolatis, acuminatis, acutis, planis, margine scabris vaginis striatis, pubescentibus; paniculis solitariis, densis, cylindricis, spiciformibus, setis scabris asperis; setis spicula plus minus longioribus, ad basin spiculæ solitariis; spiculis sub-bifloris; glumis exterioribus obscure 4–6-nerviis, glabris; gluma florifera (glumella) ovata, obtusa, enervi, striata, tuberculata, subcrustacea.—*Setaria viridis*, Pal. de Beauv. Agr. t. 14. f. 3.

Hab. Aden, in umbris arbuscularum (*T. Anders.*).

Distr. In toto orbe calidiore.

Annua, in Aden, herba pusilla 3–6 uncialis. *Paniculæ* interdum simplices.

3. PENNISETUM, *Pal. de Beauv.*

1. P. CENCHROIDES (*Rich. in Pers. Syn.* i. p. 72). Culmo erecto, ramoso, glabro; vaginis glabris, margine ciliatis, ligula barbato-ciliata; foliis linearibus, acutis, planis, pilosis; paniculis solitariis spiciformibus, cylindricis, obtusis; involucri setis aristæformibus, inæqualibus, basi plumosis, apice purpurascentibus; spiculis 2–3-floris; gluma florifera (glumella) subcartilaginea, 3-nervia; ovario glabro; stylis inferne connatis, plumosis.—*Cenchrus ciliaris*, Linn. Mant. p. 320; *P. rufescens*, Spreng. in Schimp. Pl. Arab. n. 153; *Cenchrus pennisetiformis*, Hochst. et Steud. in Schimp. Pl. Arab. n. 973; *P. ciliare*, Link, Hort. Ber. ii. p. 216; *P. distylum*, Guss. Fl. Sic. Prod. Suppl. i. p. 12; *P. ciliatum*, Parlat.

Hab. Aden, in locis depressis arenosis (*Hook. fil. et T.*!).

Distr. In locis aridis regionum calidiorum Africæ et Asiæ.

Tribus STIPACEÆ.

4. ARISTIDA, *Linn.*

1. A. ADSCENSIONIS (*Linn. Sp. Pl.* p. 121). Radice fibroso, tomentoso, culmis plurimis decumbentibus vel erectis, vaginis nodisque glabris, ligulis obscure vel barbato-ciliatis; foliis linearibus, acutis, involutis, margine scabris; paniculatis, coarctatis, subsecundis, basi interruptis; spiculis unifloris; glumis subulatis inæqualibus, muticis, glabris; gluma florifera (glumella) apice triaristata, aristis scabris.—*A. cærulescens*,

Desf. Fl. Atl. t. 21. f. 2; *A. depressa*, Retz. Obs. iv. p. 22; *A. vulgaris*, Trin. et Rupr. Stip. 131; *A. gigantea*, Linn. fil. Suppl. p. 113; *A. Canariensis*, Willd. Enum. p. 99; *A. Mauritiana*, Kunth. Gram. i. p. 265, t. 44; *A setacea*, Retz. Obs. iv. 22, in Jacq. Pl. Ind. Orient. ex Herb. Mus. Paris.; *A. Hystrix*, Roxb. Fl. Ind. ed. 1832, p. 350, fide Planchon, in herb. Hook.

Hab. Aden, rarissime (*Hook. fil. et T.*!).

Distr. Ab insulis Canariensibus per Africam borealem et centralem usque ad Ceylaniam atque Indiam orientalem.

Species variabilis, 3-uncialis vel fere 2-pedalis, plerumque glabra; nodi glabri. *Paniculæ* sæpe purpurascentes; setæ 4–6 lin. longæ, scabræ vel sublæves.

I have not given all the synonyms for this plant, but only those names that are important with reference to the flora of Arabia and India.

5. STIPAGROSTIS, *Nees.*

1. S. PLUMOSA (*Munro, MSS. in Herb. Benth.*). Cæspitosa; radice fibroso, fibris crassiusculis tomentosis; caulibus plurimis, basi vaginis marcidis vestitis, glabris, nodis constrictis, vaginis glabris apice ciliatis; foliis rigidulis, linearibus, mucronato-acutis, margine involutis; paniculis oblongis, laxis, simplicibus; ramulis capillaribus, alternis, flexuosis; pedicellis filiformibus, flexuosis, glabris, apice incrassatis; glumis inæqualibus, oblongo-lanceolatis, glabris vel puberulis, interiore exteriorem superante; gluma florifera (glumella) oblonga, involuta, tubulosa, chartacea, 3-nerva, tuberculata, longissime aristata, aristis articulatis, tortis, erectis, canaliculatis, papilloso-scabris; laciniis lateralibus barbatis, lacinia media laterales triplo quadruplo superante, plumosa; palea cuneato-obovata, apice truncata, involuta, hyalina, glaberrima.—*Aristida plumosa*, Linn. Sp Pl. p. 1666. *A. lanata*, Forsk. Descr. p. 25, *Arthratherum plumosum* in Coss. et Dur. Fl. Alg. p. 82. *A. pogonoptilum*, Jaub. et Spach, Ill. Pl. Or. iv. p. 56, t. 337. *Aristida Paradisea*, Edgew. Journ. Asiat. Soc. Bengal, vol. xvi. p. 1219.

Hab. Aden (*Edgew.*, *Hook. fil. et T.*! *T. Anders.*).

Distr. In Arabia Felici! et Petræa! per Asiam calidam usque ad Punjab. In Abyssinia et Ægypto.

Gramen gracile et formosum. *Aristidæ ciliatæ*, Desf., proxima, sed differt foliis non abbreviatis, culmis ad nodos glabris, vaginis inconspicue ciliatis, et stipite aristæ non torto.

Tribus CHLORIDEÆ.

6. TETRAPOGON, *Desf.*

1. T. VILLOSUM (*Desf. Fl. Atl.* ii. p. 389, t. 255). Cæspitosum; radice fibroso-tomentoso; culmis paucis, erectis, basi dense vaginatis, foliatis, ad nodos glabris; vaginis striatis, glabris, rarissime infimis pilosis, supra medium margine scarioso; ligula inconspicua, non ciliata;

spicis terminalibus, solitariis, densissimis, sericeo-villosis, folio spathiformi involucratis; rachibus sæpe geminis, cohærentibus; spiculis 3–4-floris, longe pilosis; flosculis inferioribus hermaphroditis, superioribus sterilibus; glumis membranaceis, breviter acuminato-aristatis, persistentibus, glabris; exteriore villosa, longe aristata, cucullata, interiore obtusa, ciliata; gluma florifera (glumella) solitaria, villosa, aristata.—*Chloris villosa*, Pers. Syn. i. p. 87. *C. Tetrapogon*, Pal. de Beauv. Agrost. p. 158.

Hab. Aden! (*Hook. fil. et T.*!).

Distr. In Arabia Petræa! et Felici! Scinde! Algeria, et insulis Canariensibus!

7. DACTYLOCTENIUM, *Willd.*

1. D. ÆGYPTIACUM (*Willd. Enum.* 1029). Cæspitosum; caule prolifero repente, radicante; culmis adscendentibus; vaginis basi tuberculatis, pilosis, superne glabris; ligulis ciliatis; nodis constrictis, glabris; foliis lineari-lanceolatis, acutis, planis, margine papillis piliferis sparse tuberculatis; spicis terminalibus, horizontalibus, digitatis, ternatis vel quaternatis, crassiusculis, densis; rachi in mucronem prolongata; spiculis imbricato-unilateralibus, 3–5-floris; glumis acutis marginatis, minute ciliatis, carinatis, exteriore breviore, aristata, arista spiculis longiore; florifera (glumella) acuta, carinata, glabra, bifida; palea carinata, mucronata, aristata; semine transversim ruguloso.—*Cynosurus Ægyptius*, Linn. Syst. Pl. p. 185. *Eleusine Ægyptiaca*, Roxb. Fl. Ind. ed. 1832, i. p. 344. *D. mucronatum* et *D. prostratum*, Willd. Enum. 1029. *D. australe*, Steud. Gram. p. 212. *D. aristatum*, Link, Hort. i. p. 50. *D. Figarei*, Notar. (Steud. *l. c.*). *D. distachyum*, Bojer, Hort. Maurit. p. 370. *Chloris mucronata*, Mich. Flor. Bor.-Amer. i. p. 59.

Hab. Aden (*Hook. fil. et T.*!).

Distr. Per totum orbem calidiorem.

Tribus FESTUCACEÆ.

8. ERAGROSTIS, *Beauv.*

1. E. CILIARIS (*Link, Hort. Ber.* i. 192). Radice fibroso; culmis ramosis, geniculatis; vaginis papilloso-tuberculatis, pubescentibus, apice ciliatis; foliis anguste linearibus, planis, patentibus; paniculis coarctatis, thyrsiformibus, interruptis vel continuatis, compositis; spiculis 6–12-floris; glumis membranaceis, naviculæformibus, acutis, carina barbata; gluma florifera (glumella) mucronata, 3-nervi; palea ciliata. —*Poa ciliaris*, Linn. Sp. ed. Willd. i. p. 402. *E. pulchella*, Parlat.

Hab. Aden (*T. Anders.*).

Distr. In Arabia Felici! India! et Ceylania! per totam Africam! in insula Adscensionis! in America australi ad Para!

This is an exceedingly variable plant; my specimens from Aden are only about 1½ inch high.

9. ÆLUROPUS, *Trin.*

1. Æ. ARABICUS (*Steud. Nomencl.* p. i. 30, *Gram.* p. 298). Culmis repentibus, numerosis, ramosissimis, elongatis, teretibus, incrassatis, vaginis persistentibus imbricate vestitis; vaginis margine ciliatis; ligula nulla; foliis brevissimis, rigidis, subulatis, pungenter mucronatis, glaucis; paniculis in ramis terminalibus ovatis, conglomeratis; rachi pubescente, spiculis multifloris; glumis 2, obovatis, muticis, scariosis, carinatis; gluma florifera subpatente, sericeo-ciliata, pubescente, ad apicem glabra, 3-nervi, paleam paulo superante, mucronulata; palea binervi, mucronulata vel mutico-obtusa; caryopsidibus ovatis, obtusis, glabris.—*Calotheca Arabica,* Spr. Syst. Veg. i. p. 348. *Festuca mucronata,* Forsk. Descr. p. 22. *Festuca pungens,* Vahl, Symb. i. p. 10, t. 2. *Dactylis mucronata,* Steud. Gram. p. 298.

Hab. Aden, in arenosis (*Hook. fil.*! *T. Anders.*).

Distr. In Arabia.

Cæspitosus, horridus, 2–3-pedalis. *Culmi* vaginis marcidis occulti. *Folia* glauca, ½ unc. longa. *Paniculæ* pubescentes, 1 unc. longæ.

ADDENDUM.

SINCE the printing of this *Florula,* I have seen a specimen of a *Fissenia,* collected at Aden by Dr. Courbon, of the French exploring expedition under the command of Captain Russel, and kindly communicated to Dr. Hooker for my inspection by Prof. Brongniart of Paris. This is the plant upon which Brown founded the genus, and of which I have examined his original specimen in the British Museum: it does not, however, bear the name *Fissenia,* but *Kissenia,* in honour of its discoverer, M. Kissen, a traveller in Arabia. Endlicher, who is responsible for the spelling *Fissenia,* probably obtained the generic name for the South African species, orally, from R. Brown. After a careful comparison of the Arabian and South African specimens, I can find no difference, and I therefore

propose that R. Brown's name of *K. spathulata* be substituted for *F. Capensis* (and *Cnidone Mentzeloides*).

Ordo LOASACEÆ.

KISSENIA, *R. Br.* (*Fissenia*, Endl. [*errore*].)

Calycis tubus cum ovario connatus, 10-costatus; limbus 5-partitus, lobis æqualibus. *Petala* 10, decidua, in apice calycis tubi inserta; 5, calycis lobis alterna, rotunda, concava; 5, calycis lobis opposita, minora, ligulata, incurva. *Stamina* indefinita; antheris bilocularibus, introrsis. *Ovarium* triloculare; loculis uniovulatis.

1. K. SPATHULATA (*R. Br., MSS. in Herb. Mus. Brit.*). Caule erecto, striato, papillis scabris aspero; foliis alternis, petiolatis, inferioribus 3–7-lobis, superioribus lineari-lanceolatis, bracteiformibus, acutis, grosse sinuato-dentatis, utrinque asperrimis; calycis tubo ovato, in fructu 10-costato, costis pilis fulvis tomentosis; limbo 5-partito; lobis longe spathulatis, subherbaceis, 3-nerviis; petalis 10, biseriatis, calyce multo brevioribus, 5 majoribus calycis lobis alternis, carinatis, ovatis, concavis; 5 minoribus lobis oppositis, ligulatis, angulatim incurvis; stylis 3, brevibus; fructu lignoso, 3-loculari, sæpe abortu monospermo; seminibus ovatis, compressis.—*Fissenia Capensis*, Endl. Gen. Plant. Suppl. ii. p. 76, absque descriptione. *Cnidone Mentzeloides*, E. Mey. in Herb. Drège, et Presl, Bot. Bemerk. p. 73. *Fissenia Capensis*, Harvey in Thesaur. cap. i. p. 61, et t. 98, sub nomine *F. Mentzeloides*, R. Br.

Hab. Aden (*Courbon*!).

Distr. In Namaqualand, regione subtropica Africæ austro-occidentalis!

Frutex sublignosus, asperrimus, 4–5-pedalis. *Cortex* pallidus. *Folia* 2 unc. longa, 1–1½ unc. lata; *petiolus* ½ unc. longus, teres, striatus, basi dilatatus, in nervum prominentem prolongatus. *Calyx* accrescens, in fructu 1½ unc. longus; lobis reticulato-nervatis, scabris. *Corolla* calycis lobis dimidio brevior, straminea.

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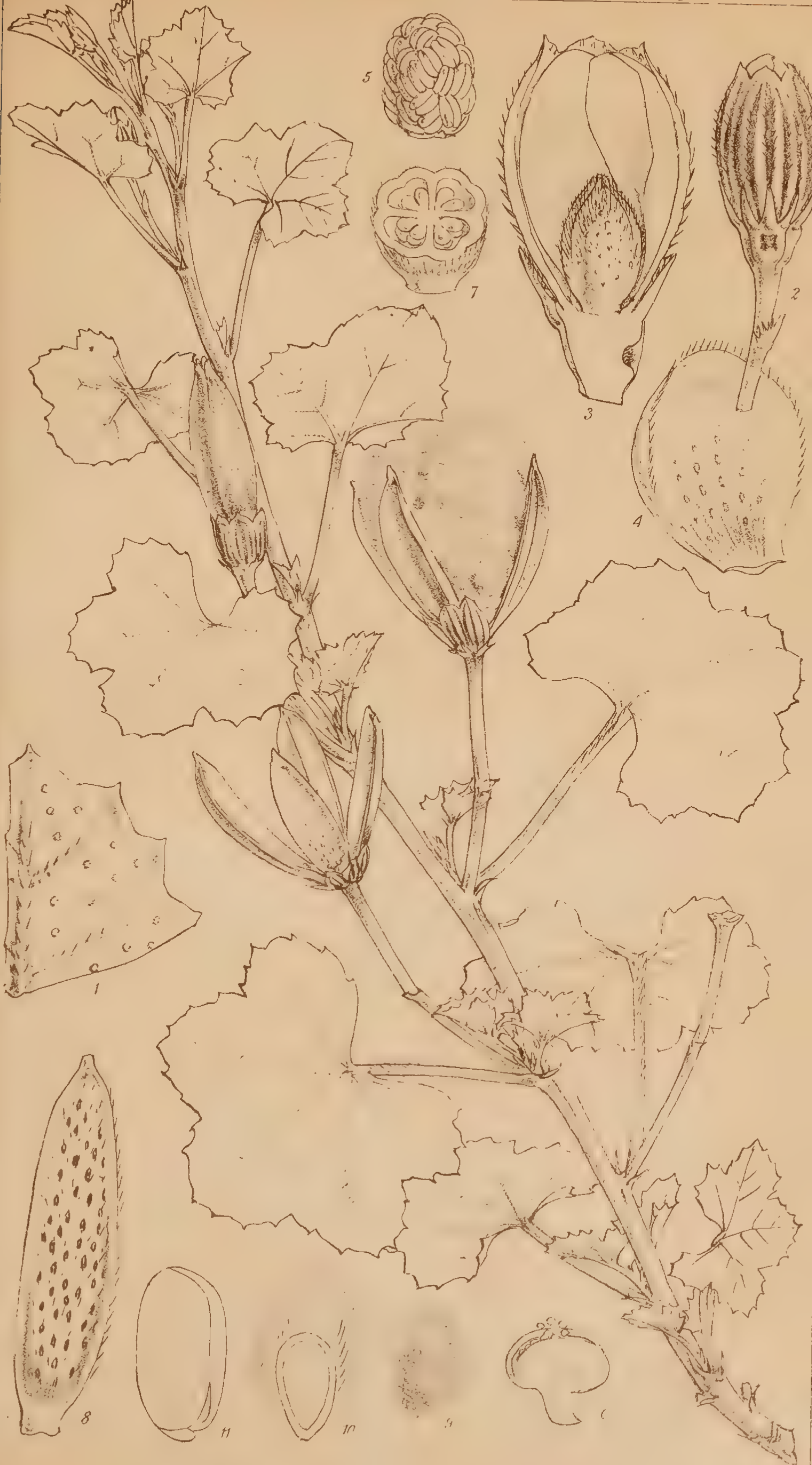

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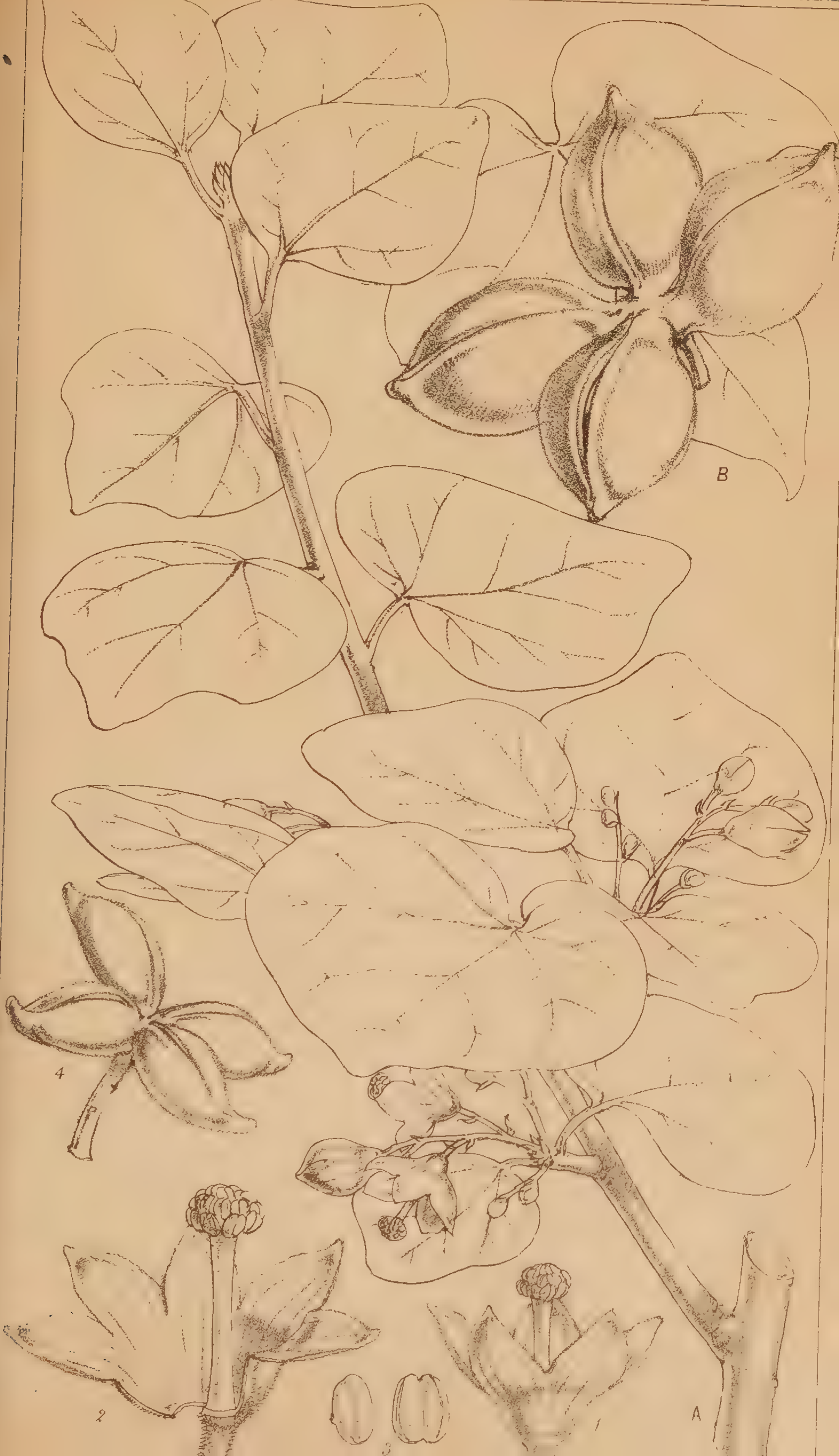
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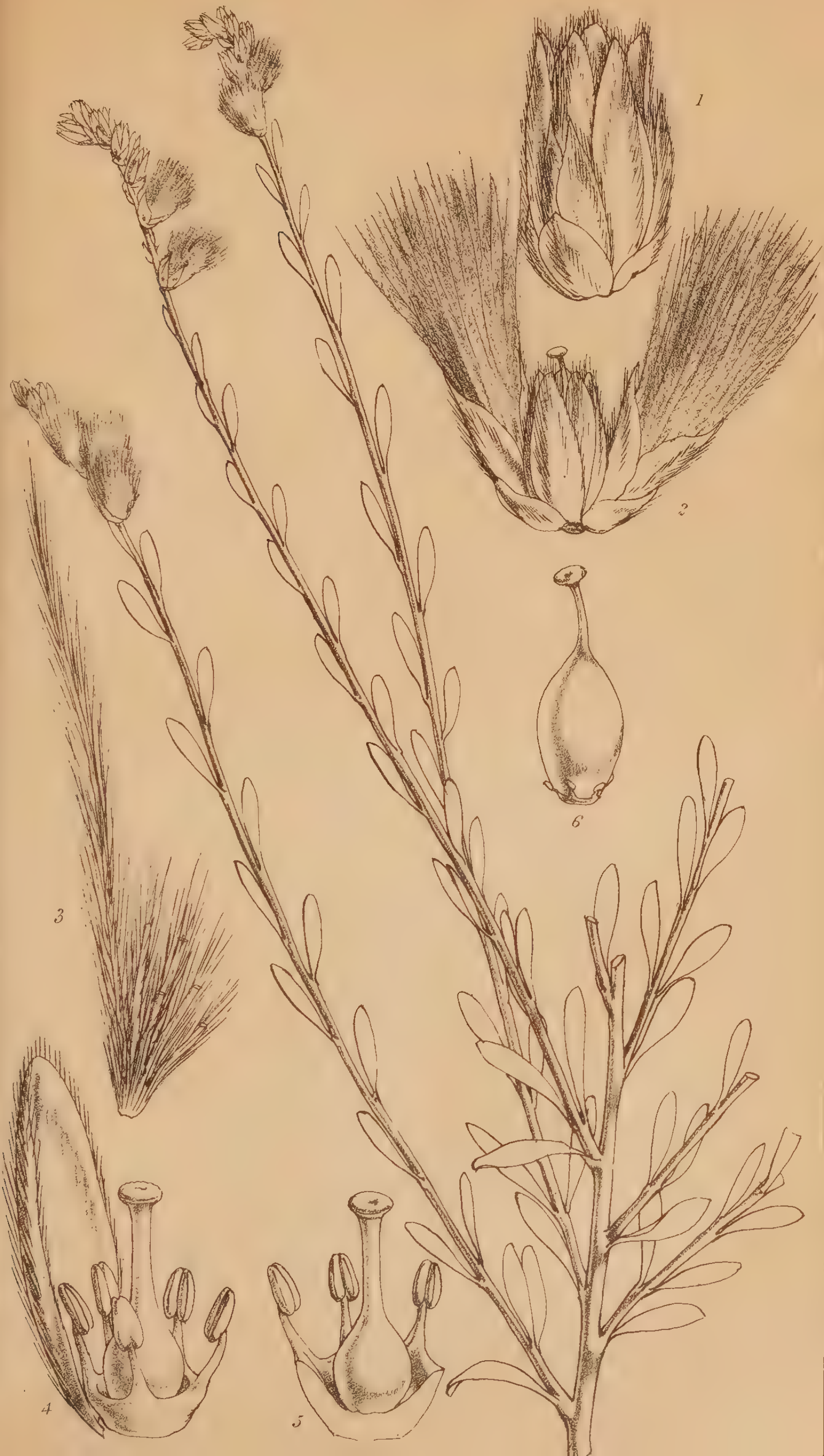
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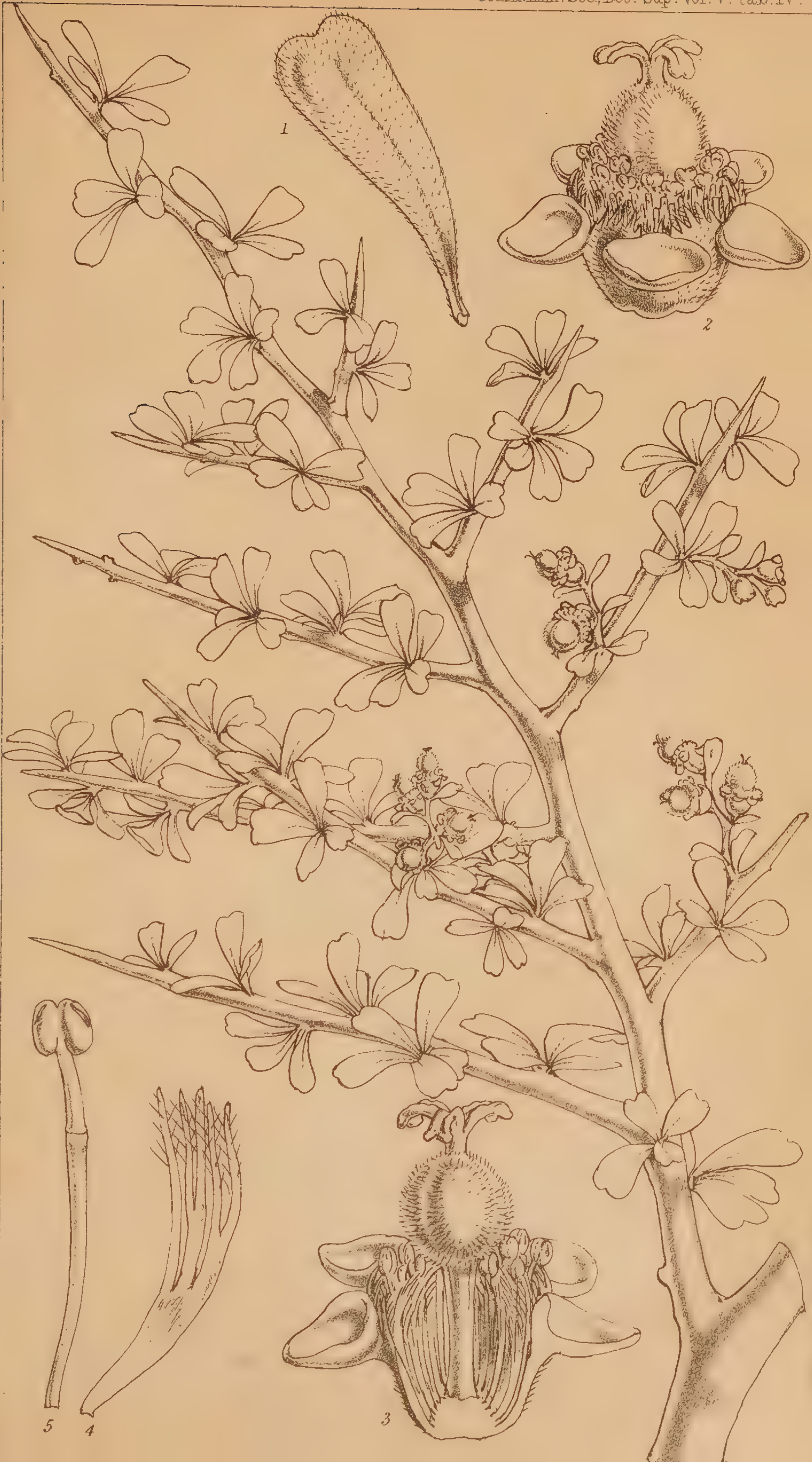
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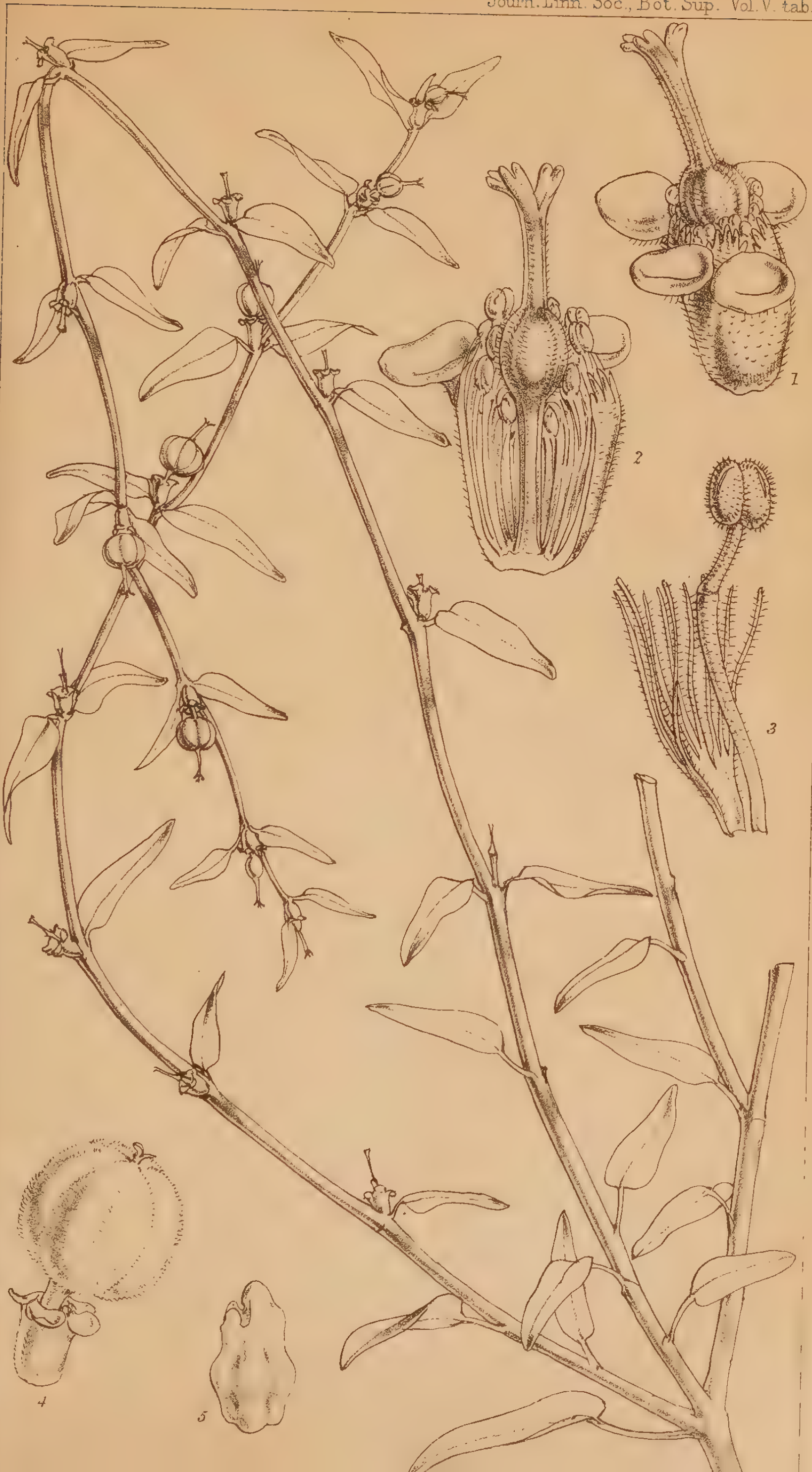
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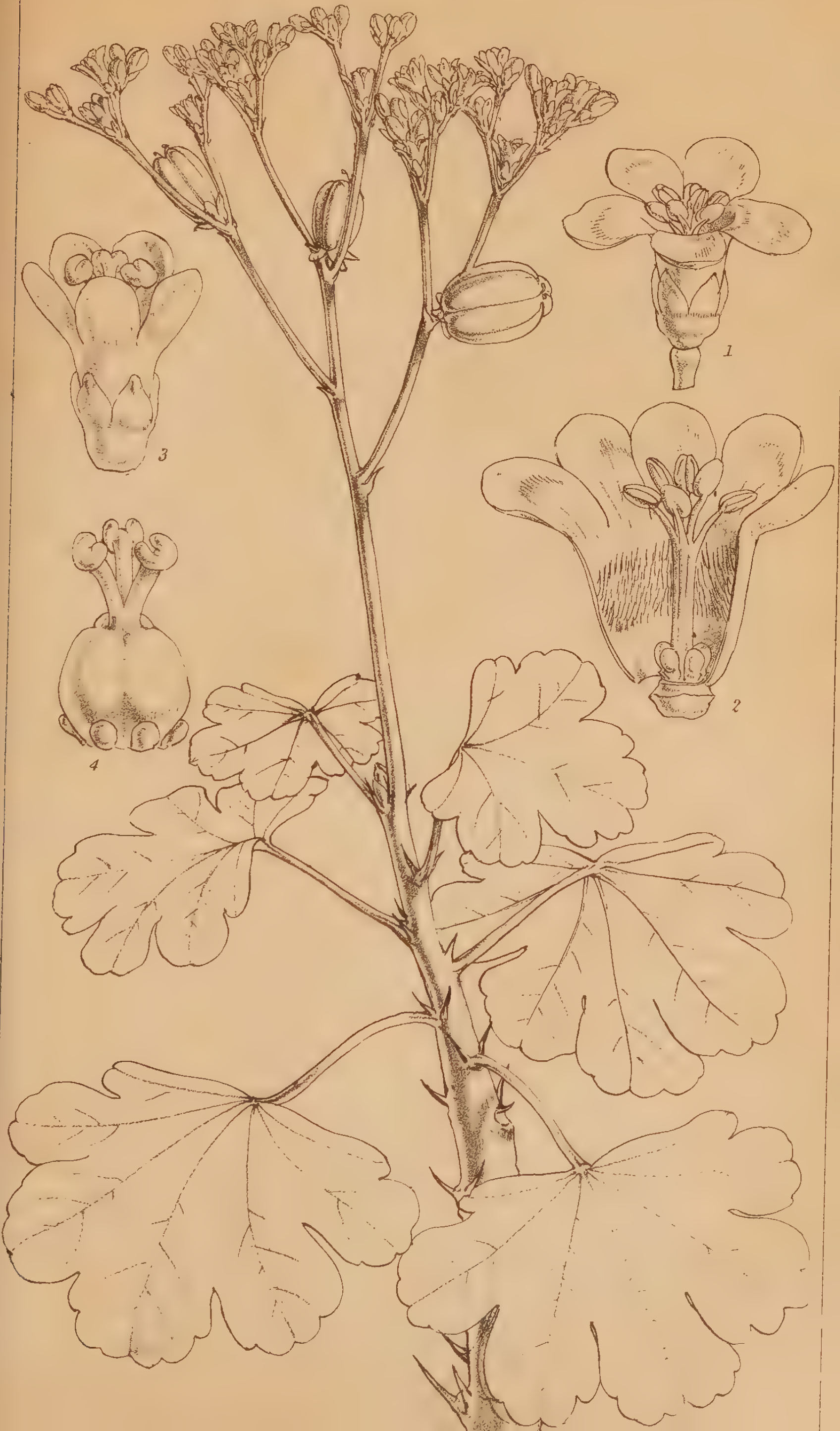
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JOURNAL

OF

THE PROCEEDINGS

OF

THE LINNEAN SOCIETY.

SECOND SUPPLEMENT TO VOL. V.—BOTANY.

CONTAINING

NOTES ON AURANTIACEÆ.

By DANIEL OLIVER, Esq., F.L.S.;

AND ON

MENISPERMACEÆ, TILIACEÆ, BIXACEÆ,

AND

SAMYDACEÆ.

By GEORGE BENTHAM., Esq., V.P.L.S.

LONDON:
SOLD AT THE SOCIETY'S APARTMENTS, BURLINGTON HOUSE;
AND BY
LONGMAN, GREEN, LONGMANS AND ROBERTS,
AND
WILLIAMS AND NORGATE.
1861.

PRINTED BY TAYLOR AND FRANCIS,
RED LION COURT, FLEET STREET.

SUPPLEMENT

TO THE

JOURNAL OF THE PROCEEDINGS

OF THE

LINNEAN SOCIETY OF LONDON.

The Natural Order *Aurantiaceæ*, with a Synopsis of the Indian Species. By DANIEL OLIVER, Esq., F.L.S., Professor of Botany in University College, London.

[Read December 6th, 1860.]

THE review of the genera of the natural order *Aurantiaceæ** and synopsis of the Indian species which I am now permitted to lay before the Linnean Society, is chiefly based upon the examination and dissection of very numerous specimens in the large collection, belonging to that family, contained in the Kew Herbarium.

Of the papers upon the genera and inter-generic relations of the

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* Exclusive of the species of *Citrus*. Feeling it utterly hopeless usefully to define them, I have thought it best to leave the Oranges, Lemons, Limes, and their allies as I found them. It has been difficult to form, for purposes of comparison, any satisfactory approximate estimate of the number of species in this very variable and widely cultivated genus. From the data afforded by Risso, Loureiro, Wight and Arnott, Miquel, and others, and from what I have myself seen of dried or living specimens, I have assumed five as about the probable number. Roemer, in his 'Synopses Monographicæ,' enumerates (exclusive of some dubious names of Rafinesque's) between thirty and forty species! This botanist institutes moreover no fewer than seven new genera of *Aurantiaceæ*. I do not consider that any of them can, with advantage, be adopted. His work is made up apparently from published descriptions of species without examination of specimens; the same species occurring sometimes two or three times over, and not always in the same genus. I wholly agree with M. Planchon's observation in 'Hortus Donatensis,' (p. 18 in note), on the '*Aurantiaceæ*' of the 'Synopses.'

Aurantiaceæ which require a brief allusion here, one of the earliest and most important is certainly the essay of Correa de Serra in the 'Annales du Muséum'*, entitled "*Observations sur la Famille des Orangers et les Limites qui la circonscrivent.*" Considering the period, a remarkably good appreciation of natural affinities is manifest, both in the observations upon those characters which he conceived to be available for the purpose of generic grouping, as well as in the redistribution of the genera of *Aurantiaceæ* there proposed. In this paper, *Atalantia* and *Glycosmis*, new and natural genera, were founded; while, on the other hand, one or two previously published genera (*Bergera*, *Chalcas*, *Clausena*) were merged. The opinion of Correa de Serra that *Bergera* is not generically distinct from *Murraya* I coincide in, though I should scarcely perhaps have united them, had I not had the opportunity of examining an Archipelago plant of Lobb and Cuming, from the Philippines, which supplies an important connecting link between them. I do not, however, agree with him, and with Sprengel, that *Clausena* should be, in like manner, united with *Murraya*. The addition of new forms since Correa wrote, tends to establish *Clausena* as one of the more distinct generic types of the order. As in *Clausena*, so also in most of the genera, new species from India, Eastern Asia, the Archipelago, Australia, and Africa, have materially altered the aspect of the family; and as these accumulating materials have been too often published from insufficient data and without the advantage of herbarium comparison, and have been also allocated on very artificial, if not on arbitrary grounds, the order would seem about to fall into a sort of ill repute in consequence of the best types for the systematist having thus become almost entirely swamped.

Correa de Serra† regarded the genus *Citrus* as expressing the type and centre of affinity of the *Aurantiaceæ*. If in the species known at the present time, the numerical proportion of those presenting numerous important structural features in common be the main element in determining the type, it can scarcely be said that the multilocular ovary, numerous ovules, and numerous usually polyadelphous stamens of the genus *Citrus* permit it fairly to represent the order. The number of species having normally five cells, or fewer, to the ovary, ovules solitary or in pairs, and stamens very rarely normally exceeding ten, I estimate approximately at about sixty (53 to 75); these at present are referred to ten genera. Of polyandrous, multiovulate species, I reckon but about ten or eleven, belonging to three or four genera. Nevertheless I consider that it is in the genus *Citrus*, or at any rate in the group *Citreæ*, that the maximum departure, not of aberrant character, from all other ordinal types is obviously attained.

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* Tom. vi. (1805) p. 376.

† *Loc. cit.* p. 378.

The *Citreæ* are a little abruptly separated from the rest of *Aurantiaceæ*. There are, however, remarkable bonds of union in two species from Eastern Asia, one of which I consider must for the present remain in *Atalantia (A. Hindsii)*; the other, half *Citrus*, half *Atalantia*, may perhaps be regarded of generic mark, though, in the absence of fruit, I have not ventured to describe it under a new name. The genera which it immediately connects seem too far removed to admit of its being appended to either without very unduly weakening their diagnostic formulas; to maintain which without sacrificing too greatly the conception of a natural group, is as essential to their practical utility as is the maintenance of natural generic assemblages as resting-points for the philosophical study of plants. It is through the genera *Atalantia* and *Paramignya* (unifoliolate groups), and *Feronia*, that the true oranges further link themselves with the larger, 3-multifoliolate section of the order. The tendency so common in *Citrus* to union, more or less, of the filaments is noticeable in two genera, *Atalantia* and *Luvunga*; the former with collateral, the latter with superimposed ovules. *Atalantia* manifests a further affinity to *Citrus* in its shining unifoliolate leaves and general *primâ facie* features. The increased number of stamens in *A. Hindsii*, and their irregular polyadelphous condition, indicate yet more their intimate relationship. In all the remaining genera of *Aurantiaceæ*, apart from *Citreæ*, I find the filaments constantly free.

From the position of the *Aurantiaceæ* in the classificatory sequence of the 'Prodromus,' the order was among the earliest published in that important work (in vol. i. p. 535). M. DeCandolle's materials were limited, and as the discoveries which have since been made are numerous, his monography is now comparatively useless. He describes thirty-four species, exclusive of incertæ. Blume's important descriptive contribution appeared in 1825 in his 'Bijdragen tot de Flora van Nederlandsch Indië:' he confines himself to the species growing in Java, wild or cultivated, of which he published two new genera—*Sclerostylis* and *Micromelum*. The difficulty of clearing up my doubts by a sight of authentic specimens of Blume's species has pressed upon me, and is perhaps the chief reason why I have not aimed at a more complete monograph of the order*. *Sclerostylis* I think cannot be maintained, and most of the Indian species referred to it by recent writers I unite with *Atalantia*. *Micromelum* offers one or two peculiar features, and is, I consider, a good genus. These genera I notice in further detail in the remarks upon the several generic groups.

It is to Messrs. Wight and Arnott that we owe the first good digest of the genera. This appeared in their 'Prodromus Plantarum Peninsulæ Indiæ Orientalis;' some further observations are added by Dr. Wight in his 'Illustrations of Indian Plants.' Although they confined themselves to Indian members of the order, yet as nearly all the genera are represented in India, their observations have a general interest. The sections which they propose, *Limoneæ* and *Clauseneæ*, dependent upon the ovules being collateral or superimposed in the biovulate species (uniovulate species are included in the former section), are adopted by Meisner, by Endlicher in his 'Genera Plantarum,' and other botanists. I may observe that, to estimate the value of character afforded by the relative position of the ovules in *Aurantiaceæ* demands considerable caution. In some genera the ovules are constantly, and apparently entirely, superimposed, the upper ovule ascending or peltate, the lower pendulous (*Micromelum pubescens*); in others, the ovules are usually superimposed more or less obliquely, at times becoming almost or quite collateral. Indeed, in the same species, sometimes in the same ovary, both partially superimposed and collateral ovules may be found (*Murraya crenulata* and *Limonia alata*). Other species, again, appear to have their ovules invariably side by side, as in the biovulate species of *Atalantia*. In perhaps all of the biovulate *Aurantiaceæ* the ovules are attached to the placenta very nearly or precisely at the same level; when they are superimposed, the lower is furnished with a very short funicle, and is almost always dependent or pendulous, while the superior ovule is peltate, or more or less laterally attached. In the collateral-ovuled species the pair may be alike pendulous or laterally affixed.

Altogether, after the dissection of a very large number of flowers, I am of opinion that, like many other absolute, isolated, diagnostic characters, this breaks down in too many cases to render it of subordinal, or indeed of generic, value, unsupported by additional peculiarities. Other points prominent in the "Clavis Generum" of Wight and Arnott are the number of cells in the ovary and the number of ovules (whether one or two) in each cell. So many species are very variable and inconstant in respect to the number of cells in the ovary, although probably each (exclusive perhaps of the multilocular genera) may have its prevailing normal standard, that this character is in constant danger of misleading the student if too generally insisted upon, as is also the one-ovuled or two-ovuled cell.

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* I have felt a like difficulty in respect to the species described by Blanco in his 'Flora de Filipinas.' Though most of his plants are probably in our herbaria, and familiar to me, yet I cannot certainly identify them with his descriptions.

Though Messrs. Wight and Arnott's synopsis is the best I have seen, yet certainly the "genera" are there too precisely circumscribed to find answering to them among the defiantly loose relationships of plant life, either "entities" or abstractions of any available sort for the systematist.

The genus *Rissoa*, published by Arnott in the 'Nova Acta Acad. Nat. Cur.*' is founded upon a true *Atalantia* (*Sclerostylis*) as intimated by Dr. Wight†. Mr. Dalzell published in the 'Journal of Botany and Kew Miscellany'‡ a new genus of the order, *Piplostylis*. This genus very nearly approaches *Clausena* and also *Murraya* (including *Bergera*); and I have, after a good deal of deliberation, thought it best to unite it with the former genus. The genus *Papeda* of Hasskarl§, apart from his description and reference, I am unacquainted with. Professor Miquel in his 'Flora Indiæ Batavæ' describes nothing new, nor does he introduce any novel treatment. Mr. Thwaites, in 'Enumeratio Plantarum Zeylaniæ‖,' in a list of eighteen species, describes four as new, one of which he makes the type of a new genus *Arthromischus*. I give below reasons why I cannot unite with this excellent botanist in maintaining the genus (p. 20).

In working up the species I have had advantages which I cannot over-estimate in respect to amount of material and the free permission most liberally granted me by Sir William and Dr. Hooker to avail myself fully of it. Besides the Kew Collection, I have gone over the *Aurantiaceæ* of the Wallichian and British Museum herbaria; Dr. Lindley also has kindly permitted me to examine his valuable set. The species of which I have recast the diagnoses are chiefly Indian. Specimens from Java and the Archipelago, while enabling me to estimate generic characteristics, are not proportionally represented in the herbaria to which I have had access, and I have generally abstained from an attempt to base new or modified diagnoses upon them.

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* Vol. xviii. p. 324.

† Illust. Ind. Pl. vol. i. p. 109.

‡ Vol. iii. p. 33.

§ Cat. Hort. Bog. alter, p. 216.

‖ P. 44.

One result, especially in the case of one or two species, of this extended correlation of specimens, has been peculiarly interesting; showing, as I consider, different varying tendencies in different geographical areas occupied by them. In the case of *Micromelum pubescens*, e. g. the form originally described by Blume, growing in Java, presents moderately-sized flowers (2–3 lines), with a cupulate, almost quite entire or slightly undulate-dentate margin, the leaflets usually from 2½–3½ inches long, by 1–1½ broad, the style exceeding or not shorter than the ovary. The same form we have from Penang. In Ceylon we find the calyx more decidedly lobulate (dentate-lobulate), the style comparatively long, usually rather exceeding the ovary, the leaflets commonly narrower in proportion, varying usually from 1½–3½ inches in length, by ½ to 1½ inch in breadth. I have not seen specimens from the western peninsula of India*. In the north-east, in Sikkim, Nipal, and Assam, a strong form occurs with rather larger flowers varying from 2–3½ lines, in very broad corymbose cymes—the calyx triangularly lobate; leaflets 3½–6 inches long, by usually 1½–2 inches broad; the style moderately long, about equalling, not exceeding, the ovary.

Returning to the islands: in the Western Pacific,—Friendly Islands, Fijis, and New Caledonia,—another form occurs with flowers altogether smaller, scarcely reaching 2 lines; calyx dentate-lobulate, the style short, shorter than, or scarcely equalling, the ovary, which is frequently 4-locular, the leaflets usually broader in proportion to their length, and more decidedly ovate—from 1½–3½ inches by 1–2¼ inches. This is the *Micromelum glabrescens*, Bth., *Limonia minuta* of Forster, as pointed out by Dr. Asa Gray. Then again in Australia and its adjacent islands (Endeavour River, Wide Bay, Cape Upstart, Port Essington, Cairn Cross Island, &c.), we find a form very nearly allied to the last named, often drying a yellowish brown colour, and with the ovary varying with 4–5 or 3 cells; the young fruit too varies in amount of pubescence. A corresponding series of phases, other characters being affected, is offered by *Glycosmis pentaphylla*, a most protean and difficult species,—in respect to leaves only, varying from a simple (1-foliolate) form—the lamina 10–12 inches long by 2–4 inches broad—to pinnate (3–5 leaflets), each lamina 2–3 inches by ¾–1 inch. The number of loculaments in the ovary, though clearly normally symmetrical (5) occurs 4 or 3. The disk in one race is as a thickening of the base of the ovary with which it is entirely accrete; in another as a thickening, as it were, of the extremely short gynophore, separated by a more or less marked constriction from the ovary.

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* It is noteworthy that it has not yet, as far as I am aware, been found there.

In the case of the two plants here spoken of, I have united under one species those forms which I felt myself unable intelligibly to define separately for systematic purposes*. In this course I conceive a second advantage to accrue in the comprehensiveness of view which it is adapted to lead one to take in respect not only to the geographical relations, but, if I may so say, the history of the species into which it affords perhaps some small measure of insight. Partly in deference to the course followed by more experienced botanists, I have not thus combined a plant found at the Cape—the only South Continental African member of the order—with one of the western peninsula of India, with which it entirely agrees, excepting that usually the foliage is smaller and the ovules more nearly, indeed almost truly, collateral. I speak of *Clausena inæqualis*, Bth., and the Indian *C. Willdenovii* (including *C. nana*). On this latter account—the tendency to have the ovules collateral—a special "genus" has been framed for the reception of the Cape plant.

I have united with *C. inæqualis* specimens from Cape Coast, gathered by Vogel (the *C. anisata* of Fl. Nigrit.); a more paniculate plant, of which I have seen several specimens in the Hookerian and British Museum herbaria, prevails in West Africa, which I think the true *Amyris anisata*, Willd. It is possible Vogel's plant may be a reduced state of this; it however closely resembles the Cape plant.

Notwithstanding the number of specimens which I have had through my hands, either dried, or in the fresh state from the Royal Gardens, I acknowledge that two or three of the genera I leave in a very unsatisfactory condition. Nor do I see how, under present circumstances, I can safely do otherwise. Indeed, until the species of the Eastern and Southern Indian Archipelago and of North Australia have been more fully collected and collated, it would be useless to attempt more. The genera which I feel to be thus opprobrious are *Limonia* and *Triphasia*. *Limonia* includes, of Indian species, *L. acidissima* and *L. alata*. These plants differ very considerably in habit as well as in floral characters, as stated below. Roemer placed the former plant in his genus *Hesperethusa*, and had it not been the original Linnean *Limonia*, I should have been disposed to allow it there to stay; but as, if one of the species be separated from *Limonia*, *L. acidissima* must remain, I have not ventured to separate *L. alata*, failing any plant in the herbaria which I have examined more clearly congeneric with it. As to *Triphasia*, *T. trifoliata* appears worthy of generic distinction, but *T. monophylla*, DC., I consider a trimerous *Atalantia*, and *T. glauca*, Ldl., an Australian plant, awaits further collectings before it can be permanently settled. It is but doubtfully a congener of *T. trifoliata*.

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* It is sometimes alleged, that to treat any forms technically as varieties or as of subordinate rank to the species, is tantamount practically to totally disregarding them; and there may be, I admit, some truth in this; yet why should it be so? Many forms which have been raised to the rank of species, much to the encumberment of science, might well have been left disregarded, were that the only alternative.

The structure of the flowers in *Aurantiaceæ* offers hardly any remarkable or anomalous feature. They are all regular and usually symmetrical; the ovary, however, frequently independent, in this regard, of the outer whorls. In *Piplostylis* (now merged in *Clausena*), a 3-celled ovary appears the prevalent condition (it varies with 4, 5, or even 2) with outer whorls normally pentamerous. With the exception of cohesion of filaments in two genera noted above, and the usually more or less gamosepalous calyx, either cohesion or adhesion in the three outer whorls is exceptional. I find in *Atalantia monophylla* a tendency in the petals to adhere slightly to the base of the staminal tube: this is the only case of notable adhesion that I have remarked. The sepals exhibit all grades of cohesion, and vary from rotundate or ovate broadly imbricating segments, separate to the base in *Glycosmis*, to the cupulate or urceolate, often almost entire calyx, of some species of *Citrus*, *Paramignya*, *Luvunga*, &c. In some forms of *Murraya exotica* the calyx lobes are proportionally narrower than in the rest of the order, and must be almost or quite valvate in æstivation. The petals, normally 3, 4, or 5 in number, glandular, firm, and mostly fleshy (least so in *Clausena*, which is rather characterized by thinner petals), are free; in æstivation usually imbricate, though in some *Micromelums* they become quite valvate, with often a trace of obliquity at the margins; in *Clausena*, though clearly imbricate, they are usually not so much so as in the order at large. In a *Paramignya* of Griffith's from Malacca, I find, in respect to æstivation, a very unusual condition. The corolla here appears truly valvate, indeed almost a little induplicate-valvate above, while in three at least of the four remaining species the petals are greatly imbricate. This may be an exceptional state of the one gathering which I have seen, which affords very few buds to examine; if constant, it could not be regarded as of higher than specific importance, so closely is this species allied to the rest of the genus. For the present I regard this plant as a variety of *P. citrifolia*. The stamens when definite are clearly normally symmetrical with the calyx and corolla, almost invariably, exclusive of *Citrus* and *Ægle*, being the double number of the petals*.

In *Micromelum*, *Glycosmis*, *Clausena*, *Murraya*, the filaments are always alternately shorter, the longer filaments alternating with the petals. In *Atalantia* this alternation in length is more or less apparent, while in the remaining genera the stamens are nearly or quite equal at flowering.

The ovarium, in some genera sessile, resting in or surrounded at the base by a fleshy, free, or accrete, often cupulate disk, in others is very shortly but distinctly stipitate, especially in *Paramignya* and *Clausena*; in some species of which latter genus the short gynophore is considerably narrower than the ovary; yet the base of the latter is apparently encircled by a connate "disk," which in species with a pilose ovary is conspicuous, owing to its usually remaining nearly smooth. The contorted dissepiments of the ovary in one or two species of *Micromelum*, after or indeed at the time of flowering, form a curious feature to which I cannot recollect a precise parallel† (*vide infra*, p. 19). The style varies in length, but we do not find the stigma truly sessile in any *Aurantiaceæ*, unless we include the American genus *Casimaroa*. Often considerably elongated and conspicuously narrower than the ovary, which it may exceed in length, as in *Murraya*, *Citrus*, *Paramignya*, in other genera it is much shorter; in *Clausena* either long or short, while in *Glycosmis* we find the extreme in its reduction; the entire pistil being in one or two species shortly conical or almost cylindrical. The passage of the ovary into the style is in certain genera very gradual, in others very abrupt, the base of the style being also sometimes slightly constricted. There may be in a few species a true articulation at their union. In nearly, if not quite, all of the species, with the exception of *Glycosmis*, the style after flowering separates at or towards the base, either irregularly, or leaving a clean horizontal scar. In one species, *Atalantia monophylla*, this indurated scar or pseudostigma has been mistaken for a stigma, and a species accordingly founded on it (*A. platystigma*, R. W.). With regard to the style and ovary, though the relative proportional lengths vary considerably through the order, the species of each of the more natural genera are tolerably uniform.

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* *Limonia oligandra*, Dalz., 'Journ. Bot. and Kew Misc.' ii. 258, is a species of *Toddalia*.

† I think in a young berry of *Clausena Wallichii* I have observed a similar twisting.

The fruits of the various species offer marked contrasts; with the familiar *Hesperidium* we find but little in common either in the succulent 1- or 2-seeded berry of *Glycosmis*, or in that, often almost dry, of *Clausena* and *Micromelum*. None of the fruits of the *Aurantiaceæ*, that I am aware of, dehisce; and in this we find one distinguishing mark from a prevalent character of the allied *Xanthoxylaceæ*. The seeds usually present a pair of equal, fleshy, more or less planoconvex, oval or oblong cotyledons, unless mutual pressure, or a plurality of embryos, alter their form, as is frequently the case. The most remarkable difference from the typical structure is in the embryo of *Micromelum*; the *cotyledons* (in *M. pubescens*) being foliaceous, broad, almost or quite reniform or cordate, and contortuplicate, with a conspicuous radicle.

The inflorescence in *Aurantiaceæ*, upon the whole, I regard as essentially determinate and cymose, as is generally manifest in the multifoliolate genera (e. g. *Glycosmis*, *Micromelum*); in some species of *Atalantia*, and in *Citrus**, this determinate character is less obvious, though I think it still obtains†.

Upon the geographical distribution of the *Aurantiaceæ* I have not much to observe. The genera and species greatly preponderate in India, the Malayan Peninsula and Archipelago, four or five genera extending north to China and Japan; four or five differing widely from each other, representing at least two (perhaps each) of the three sections of the order usually adopted, reach Australia—viz. *Citrus australasica*, Planch‡, *Triphasia glauca*, *Glycosmis arborea*, var. and *Micromelum pubescens*, var. and one or two undetermined species. Ten genera, containing fifteen or sixteen species, are found in Ceylon. I have not seen any Madagascar specimens, although species are described from thence. In South Africa is one species; in West Africa perhaps two, *Clausena anisata* and *Glycosmis africana*. The specimen of the latter plant is so very bad that I cannot tell whether it be truly a *Glycosmis*; no flowers have been described. Northwards from Cochin China the unifoliate, shining-leaved, shrubby forms prevail; while in India and the Archipelago several of the unifoliolate species are more or less scandent, and, with some pinnate-leaved species, pubescent or shortly pilose. In Continental India, Malacca, and Ceylon, and the islands of the Indian Ocean, there are twelve genera. Of these at least nine occur also in the Archipelago and Australia. I cannot give a precise estimate of the Archipelago species. In the islands no marked type is presented, so far as I am aware, differing from those of the main land. *Triphasia glauca* of Australia is, perhaps, the most distinct in this respect.

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* Conf. Payer, Organ. Végét. p. 113.

† A. DeCandolle, in a valuable memoir upon the *Begoniaceæ* (Ann. Sc. Nat. Ser. iv. Bot. vol. xi. p. 100), intimates his opinion that axillary cymose inflorescences are infrequent associated with truly alternate leaves.

‡ This differs from typical species of *Citrus* in its free stamens. Specimens in fruit, closely resembling *C. australis*, are in Sir W. Hooker's herbarium from Cunningham, under the name of *Limonia australis*; though Cunningham's memorandum states the only flower he could find was decandrous and the stamens free; it may be possibly an *Atalantia* allied to *A. missionis*.

Unless *Papeda* of Hasskarl be generically distinct, we have no generic type in the Archipelago unrepresented in continental India, where the order evidently finds its focus. No single species has a remarkably wide range, with the exception of the two to which I have alluded (p. 6). *Atalantia buxifolia* I believe to be an Eastern Asiatic species only, and not a Coromandel plant, as stated in Roxburgh's 'Flora Indica*.' I have seen specimens from Macao, Hongkong, and Formosa. It is a species in cultivation at Kew, and is the *Limonia bilocularis* of Roxburgh, *Severinia* of Tenore, and *Sclerostylis buxifolia* of Mr. Bentham.

There are two genera frequently associated with *Aurantiaceæ* which I have not included in this review, though I am by no means prepared to say that they can be appended to any other order with greater propriety than to this. These genera are *Casimaroa*, Ll. and Lex., and *Skimmia*, Thb. Of the former Central American species, I have examined flowering specimens contained in Sir W. Hooker's herbarium; the fruit I have not seen, but a tolerable figure of it is given in Seemann's 'Botany of the Herald,' (tab. lii.). It differs from all the species of *Aurantiaceæ* that I have examined in its uniseriate stamens (same in number with the petals), and sessile, 5-lobed, discoid stigma. The seeds are described as exalbuminous. From the drawing, the succulent tissue forming the mass of the fruit would seem to be derived from the mesocarp. This in itself, however, is comparatively unimportant, so far as its relations are concerned. Viewed in the light of Mr. Darwin's theory, the idea presents itself that the claim which *Casimaroa* may possess to be grouped with the *Aurantiaceæ* is due less to inheritance by direct descent with the other species than to divergence in the direction of this order from some allied but comparatively remote type (perhaps *Xanthoxylaceæ*); which in its turn, however, may be admitted to have sprung, with the *Aurantiaceæ*, from one common parent stock; and this view would seem to be supported by the nature of the differences which separate *Casimaroa* from truly Aurantiaceous genera, as well as by the fact that none of the latter are native (so far as is shown) in the New World.

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* Vol. ii. p. 377, *vide infra*, p. 26.

With regard to *Skimmia*, I shall not at present enter upon the discussion of its best position in the natural system; whether it ought to be appended to *Aurantiaceæ* or to *Xanthoxylaceæ*. It differs from the former order in its albuminous seeds, uniseriate stamens and abortion (or tendency to abortion) of one sex in, at least, the Himalayan species. In other respects it is exceedingly Aurantiaceous in structure, especially agreeing in the form of the pistil and in the succulent fruit. One species, *S. japonica*, is not infrequent in cultivation.

Atalantia.

Founded by Correa de Serra, in the 'Ann. du Museum' (tom. vi. 1805), on *Limonia monophylla*, L. and Roxb. (Pl. Cor. ii. 83). After an extended examination and comparison of the species which have been referred by authors to this genus and to *Sclerostylis* (*v. infra*), I have been led so to modify the generic diagnosis of *Atalantia*, as to embrace nearly the whole of these in one natural group. Correa's original *Atalantia* was characterized by tetramerous flowers and monadelphous stamens. But the importance of the character derived from symmetry I find generally too subordinate in the order to attribute any great value to it *per se*; and in one or two species referred to *Sclerostylis* by Dr. Wight and others, the filaments are more or less irregularly united or monadelphous. The species which I unite with *Atalantia* agree with it in important features, and have all a similar habit, unifoliolate leaves, and axillary inflorescence, and taken together, they constitute a natural generic assemblage.

There are, however, one or two points in *A. monophylla*, besides those which I have bridged over, which are peculiar, and constitute it, with a very closely allied plant of Helfer's, as perhaps a marked section of the genus. I have never, or very rarely indeed, found the calyx of *A. monophylla* perfect. I have seen very many specimens of it in flower, but the flowers appear to open simultaneously, and I have hardly had the opportunity of examining a sufficient number of young buds to understand clearly its original form. At the time of flowering it is invariably irregularly split, and its margin scarious and eroded. The ovary is 4-, very rarely 5-locular. In other *Atalantias* the calyx is perfect at flowering, as in all other species of the order, and usually 4- or 5-lobed or partite; the ovary being, in the species nearest to *A. monophylla*, usually bilocular. *A. Hindsii*, as observed *supra*, is a rather anomalous member of the genus. It is not improbable that further discoveries in Eastern Temperate Asia may lead to its union with other forms partaking more fully than *Atalantia* of the characters of *Citrus*.

SCLEROSTYLIS.

Blume published this genus in his 'Bijdragen' in 1825. I have not seen authentic specimens of any of the five species which he describes; but from an examination of his descriptions, and my acquaintance with Javanese species of *Aurantiaceæ*, I feel satisfied his plants may be referred, part to the genus *Atalantia*, part to *Glycosmis*. Of his *S.* (?) *macrophylla*, he says himself, "*An Glycosmis pentaphylla*?" If it should appear needful to separate from *Atalantia* the species which retain a perfect calyx at the time of flowering, the diagnosis of *Sclerostylis* might be, I think, suitably modified for their reception. The species referred by Dr. Wight to *Sclerostylis* I include under *Atalantia*. Miquel divides the genus between *Limonia* and *Glycosmis*, following Sprengel (Syst. Veget. iv. 161).

TRIPHASIA.

This genus, proposed by Loureiro in his 'Flora Cochin Chinensis,' was based on a species previously described in Linnæus' 'Mantissa' (1771) as a species of *Limonia* (*L. trifoliata*). *Triphasia trifoliata* is probably entitled to generic distinction, although I believe the ternary symmetry of its flowers alone would by no means suffice to base the genus exclusively upon. It sometimes occurs with tetramerous flowers, though rarely; the ovary and berry are also occasionally 4-locular, and the leaves 1-foliolate. It is difficult to say to which genus *Triphasia* is most nearly allied,—probably to *Limonia*. *T. monophylla*, from Timor, is a trimerous

Atalantia, as DeCandolle himself observed, differing solely from the other species of this latter genus in its ternary outer whorls. I have not had good specimens to examine myself, but M. Decaisne states the ovary to be bilocular, as it is in several *Atalantias*. *T. glauca*, an Australian shrub described by Dr. Lindley in Mitchell's 'Tropical Australia' (p. 353), is a doubtful congener of *T. trifoliata*. For the present I leave it in the genus. Before determining where finally to dispose it, the examination of more numerous flowers is desirable. I have thought that perhaps it might be associated with *Atalantia (Limonia) missionis*, an Indian species, rather isolated in its general *facies* as well as by precise characters. *T. sarmentosa*, Bl., is quite unknown to me, excepting from the description. Wight and Arnott think it probably not a *Triphasia*. I have not re-written the generic description of *Triphasia* for this paper.

LIMONIA.

The solitary *Limonia* originally described by Linnæus in the 'Species Plantarum' (ed. 2), is a very distinct plant, Xanthoxyleous in its general features, but with the flowers and fruit of a true *Aurantiacea*. The figure of it in Rheede's 'Hort. Malab.' (iv. 14), quoted by Linnæus, is very characteristic; as to Rumpf's figure, also quoted by him, I am not clear if it belong to the same species. This genus has been most unmercifully hampered by very diverse species which have been allotted to it, especially by the older botanists. Of the eleven species described in the 'Prodromus' (three as doubtful *Limonias*), 1 is a *Murraya*?, 1 *Skimmia*, 2 *Glycosmis*, 1 *Triphasia*, 1 *Micromelum*, while 3 are referable to *L. acidissima*. The remaining 2 may also be *Limonias*: they are described by Lamarck from Madagascar and Mauritius specimens, and would seem to be allied to *L. alata*. I have not re-written the description of the genus, as I do not feel that the material to which I have had access would enable me to offer a satisfactory one; especially failing Lamarck's plants, and seeing, further, that the two species which I still retain in *Limonia* differ from each other considerably in habit and some floral characters. It has occurred to me that *L. alata* may be related to *Luvunga* more nearly than has been suspected. I find the geminate ovules of this species to be sometimes both obliquely superimposed and collateral in cells of the same ovary. *Limonia missionis* I have removed to *Atalantia*, with the species of which it appears to me to have closer affinity than with *Limonia* proper.

MURRAYA (including *Bergera*).

To this genus has been ascribed a 2-celled ovary, with geminate, superimposed ovules in each cell; to *Bergera* also a 2-celled ovary, but solitary ovules. Messrs. Dalzell * and Thwaites † observe, however, as I have also found, that *Bergera* occurs sometimes with geminate ovules. Mr. Dalzell states that when there are two ovules in a cell, he finds them to be collateral. In the specimens which I have examined, I find them either obliquely superimposed, or very nearly quite collateral; thus indicating an approach to *Murraya*. Mr. Thwaites sends from Ceylon a *Murraya*, under the MS. name of *M. Glenieii*, precisely resembling *M. exotica*, but with 5 or 4 loculaments to the ovary. And, again, specimens of an *Aurantiacea* collected in the Philippines, referred by Turczaninow to *Glycosmis*, though with very decidedly the *facies* of a *Murraya*, present 5-locular ovaries with the ovules sometimes solitary, sometimes geminate, and in the latter case either obliquely superimposed or quite collateral. As in all other respects, apart from the ovarium and its contents, *Murraya* and *Bergera* closely approach each other, I have, in consideration of the facts above noted, concluded to follow Sprengel ‡ in combining the two genera. They agree well in inflorescence, in the linear-subulate filaments bearing small rotundate anthers, the rather long style—at first continuous with the ovary, at length caducous at a little above its base—and probably also in the disk bearing the scars of the fallen whorls, which after flowering grows out in one or two species so as to fill the calyx. In *Bergera* the leaves are usually slightly pubescent, at least on the rachis and midribs, and they are less coriaceous than in *Murraya*; the testa of the seeds, also, is glabrous in the former, but these of themselves are comparatively trivial exceptions. In the biovulate *M. exotica*, I find the ovules to originate at the same, or very nearly the same, level on the placenta; one of these becomes eventually pendulous and shortly funiculate, while the other, and superior, is more or less peltate.

PIPLOSTYLIS.

Founded by Mr. Dalzell, in the 'Kew Miscellany' (vol. iii. 33), upon a species met with in Bombay. The same plant (*P. indica*) has been also sent from Ceylon by Colonel Walker, Dr. Gardner, and Mr. Thwaites. Mr. Thwaites, in 'Enumeratio Pl. Zeylaniæ' (p. 46), describes it as a new species of *Bergera* (*B. nitida*), pointing out, and unwittingly emphaticizing at the same time, its near affinity with *Piplostylis indica*, known to him through Mr. Dalzell's description. Owing to this description having been based upon the examination of specimens from probably but one tract of country, it is a little too narrowly circumscribed; hence, in the absence of authentic examples, Mr. Thwaites' inability to identify the plants. Mr. Dalzell described the ovary as trilocular, Mr. Thwaites found it, in the Ceylon plant, bilocular. From the examination of specimens both from the mainland and from Ceylon, very closely according in every other character, I find the ovary varying with 3, 4, or 5 cells, commonly, however, with 3. I think the 2-celled ovary must be generally unusual. Of the identity of Mr. Thwaites' plant with that from Bombay I have no doubt.

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* Kew Journ. Bot. iii. p. 34.

† En. Pl. Zeyl. p. 46.

‡ Syst. Veget. ii. p. 315. M. DeCandolle, in Prod. i. 537, under *Bergera*, says "An a *Murraya* satis differt?"

It was my intention, as stated when I read the introductory portion of this paper before the Linnean Society, to retain the genus *Piplostylis*—for the present, at least—as distinct. Upon further consideration, however, especially in connexion with a species which I had not examined minutely at that time, I feel satisfied that the proper course is to unite it with *Clausena*. I find that this plant (*C. Wallichii*) does not permit me a single excuse for maintaining it generically distinct: the relative position of the ovules, and the carpellary symmetry pointed out by Mr. Dalzell, both fail. *C. Wallichii* is another of those species in which the ovules are found either superimposed or collateral. Generally in 5-celled ovaries they appear to be superimposed; when the cells are reduced to 4, as sometimes happens, we find, in at least one cell, that the ovules are collateral. The inflorescence, small flowers, and short distinct style present quite the characters of *Clausena* (*Piplostylis*) *indica*; approaching, also, *Murraya* (*Bergera*) *Königii*. *C. indica*, and the Javanese species described below (which, had the genus been maintained, would have been associated with it), offer, in the peculiar mode of branching of the inflorescence, and its rounded corymb-like or pyramidal form, a *facies* which it is not easy to express, dependent chiefly upon the straight secondary branches, undivided towards the base. Mr. Dalzell's figure, accompanying his notice, is well executed, and gives a very fair idea of it.

CLAUSENA (including *Cookia*).

To this genus, established by Burmann in his 'Flora Indica,' Wight and Arnott have correctly referred several Indian species, described by Roxburgh under the genus *Amyris*. The typical *Clausenæ* are characterized by pinnate, often more or less hairy leaves, tetramerous flowers disposed in cymose clusters in paniculate or racemose, terminal or axillary inflorescences, and 1- or 2-seeded berries. A few species vary with pentamerous flowers. As I consider the usually pentamerous symmetry and succulent, often 5-seeded berries of the genus *Cookia* of Sonnerat, to be in themselves insufficient to constitute valid grounds of generic distinction, I have united it, as a section, with *Clausena*. With this genus, as hitherto maintained, it agrees entirely in other respects, and especially with those species having a terminal, much-branched inflorescence. The arching concavity of the filaments is perhaps not so marked in *Cookia* as in *Clausena*. My grounds for including *Piplostylis* in *Clausena* I have stated above.

The genus *Aulacium* of Loureiro, referred to *Cookia* by DeCandolle (Prod. i. 537), must be a dubious associate of this group. I understand the leaves, from Loureiro's description, to be simple; I have not seen anything like the 4-sulcate petals which he ascribes to his genus.

GLYCOSMIS.

Based by Correa de Serra on two species referred by Retzius and Dr. Roxburgh to the genus *Limonia*, and figured by the latter in his 'Plants of Coromandel,' vol. i. tt. 84, 85. The genus *Glycosmis* I consider a natural one. It is mainly characterized by small flowers with pentamerous outer whorls, the calyx 5-partite, with broadly imbricate lobes, the very short and thick persistent style directly continuous with the ovary and sometimes of almost equal diameter, the cells of the ovary usually 5 or 3 (though sometimes it is found with 4 or 2), each cell containing a solitary ovule. The leaves consist usually of several, but not numerous, leaflets, which are glabrous and more or less coriaceous in texture. The axillary cymose inflorescence is commonly small. In one or two forms we may find 1-, 3-, or 5-foliolate leaves on the same branch. Some varieties of *G. pentaphylla* are particularly variable in this respect; in one of these, growing in Khasia and Assam, the leaflets, when solitary, are often unusually large, sometimes 10 inches in length. *Glycosmis pentaphylla*, as I have endeavoured to circumscribe it, as nearly in conformity with what has appeared to me to be the present condition of the species in nature as I could, offers, as already observed (p. 6), a very interesting study. It is a remarkably variable plant, varying especially in the number of leaflets, their size and form, the size of the flowers, the disk, and its relation to the ovary, and also the number of cells in the ovary. There are at least two principal races of this species, which are generally to be easily recognised at sight. One of these has the axillary cymose panicles often clustered towards the extremity of the branches, forming a dense mass of inflorescence exceptional in the genus; the flowers rather larger; the pistil frequently mammillate, owing to prominent immersed glands; and the disk, accrete with the base of the ovary. In a second race, the flowers are very small; the inflorescences, although of numerous flowers, much reduced in size, falling usually very considerably short of the leaves; the pistil but slightly glandular, mammillate or smooth, and separated by a slight constriction from the disk, which is sometimes very small and connate with the very short gynophore.

I should perhaps be disposed to hold these races as specifically distinct, were they not so closely united through the more Eastern variety from China and the Philippines, as well as by varying forms growing in the Peninsulas. I do not find, as in the case of *Micromelum*, that the chief races are conspicuously confined to special areas, further than that the larger-flowered race described above seems chiefly limited to the western portion of the area of the species. The Chinese and Archipelago variety (*G. citrifolia*, Ldl.) presents much of the *facies* of the first-mentioned race, with the structure of disk and pistil of the second.

MICROMELUM.

Established by Blume, in his 'Bijdragen,' in 1825. He published but one species, *M. pubescens*. Though I have not seen authentic examples, I have no hesitation in recognising his plant in Javanese specimens collected by Spanoghe, Lobb and Zollinger, as well as in numerous examples from other countries. Curiously enough, Hasskarl * refers *Micromelum* to *Cookia punc-*

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* Plantæ Javanicæ Rariores, p. 280. Of *Cookia*, he says "Semina unum alterumve evolutum, reliqua abortiva, et inde fructùs dissepimenta intorta;" and again, in 'Cat. Hort. Bogor.' alter, p. 215, in foot-note to *Micromelum* (quoted as a synonym of *Cookia*), "Calyx parvus, urceolatus, 5-fidus (nec inte-

tata, and he is followed by Professor Miquel (Flor. Ind. Bat.). I cannot doubt but that neither of these botanists is acquainted with the true plant. The essential characters of the genus rest especially in the broad, foliaceous, and remarkably contortuplicate cotyledons; perhaps, also, in the singular torsion of the dissepiments of the ovary, which, in *M. pubescens*, is usually apparent immediately after the fall of the floral whorls. How is this condition brought about? Is it due to a torsion of the axis of the ovarium? I have not ascertained whether its direction be constant; this ought to be studied upon the living plant. The fruit is but 1- (or 2-)seeded, and the twisted dissepiments with the empty loculaments are soon closely pressed to one side by the young seed. The style is minutely constricted or articulated at the base to the ovary. In *M. pubescens* the ovary is very usually 5-locular; in Ceylon and Java specimens I have found an exceptional 6th cell; in the Australian plant from Port Essington, &c., it varies, 4, 5 or 3. *M. molle*, Turcz., I have found to be 4-locular, but probably it also varies.

The peculiar features which I have remarked of the ovary and seed are associated with other common characters, which render the genus a tolerably natural one. These are especially the truly valvate or obliquely valvate æstivation of the corolla, and the terminal cymose corymbs of numerous flowers,—as in *Murraya* seldom or never having the central axis of inflorescence elongated as it is in the paniculate *Clausenæ* (including *Cookia*), and, in less degree, in *Piplostylis*. I am acquainted with but three species of *Micromelum*. From the previous observations upon *M. pubescens*, it will be apparent, however, that were the minor differences which I have alluded to regarded as of specific value, we might at least double the number of species in the genus. On this extreme view, the (1) Australian, (2) Polynesian, (3) Archipelago, Malay and Ceylon, and (4) the Sikkim and Assam forms, or varieties as I have held them, would be separated. We find the *Micromelum*, in continental Asia, confined to tracts bordering on the high lands of the Himalaya, and along the continuation of the chain, through Birma and the Malay Peninsula. May we suppose that, at a

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gerrimus!). In cæteris characterem *Cookiæ* . . . quadrans genus, floribus quinariis. Dissepimenta baccarum . . . seminibus reliquis abortivis, uno alterove evoluta intorta." I have examined both barren and 5-seeded fruits of *Cookia*, preserved in fluid in the Kew Museum, and find nothing resembling the spiral torsion of the dissepiments of *Micromelum*. Besides, the structure of the seeds is totally different.

period when the species was able to migrate to the Archipelago and Australia, physical conditions obtained which prevented its extension to the tract now forming the Western Peninsula?

PARAMIGNYA.

It is not improbable that further investigation may lead to the union of this genus with *Luvunga*. Dr. Wight, in his observations on the distinctive features of *Paramignya*[*], states it to be removed from that genus by the symmetry of the carpels and outer whorls, its usually pentamerous flowers, free filaments, and especially by "the distinct endocarp of the fruit." With regard to the number of carpels constituting the pistil, I find the only species of *Paramignya* described by Dr. Wight to vary with 3, 4, or 5. A second species (the *Arthromischus* of Mr. Thwaites) has a trilocular or sometimes a quadrilocular ovary: the other true *Paramignyas* are quinquelocular. On the other hand, *Luvunga scandens* varies with 4 to 2 cells, though usually it is trilocular. Again, the outer whorls of the flower in a *Luvunga* from Borneo are pentamerous, the stamens are free, as they are also in *L. eleutherandra* of Mr. Dalzell. I do not see any important difference between the fruits of the two genera. These main points, then, of distinction between *Paramignya* and *Luvunga* fail, and the species of *Paramignya* described by Hasskarl[†], varying with 1, 2, or 3 leaflets, would seem to unite yet more intimately the always unifoliolate *Paramignyæ* with the trifoliolate *Luvungæ*. I have not, however, seen this species, and until we possess further suites of specimens from the Archipelago, the safer course is, I think, notwithstanding their intimate relationship, to retain the genera distinct.

Mr. Thwaites proposed the genus *Arthromischus* in his 'Enum. Plant. Zeylaniæ,' p. 47. He considered it to differ from *Paramignya* in its jointed leaf-stalk, small calyx, and uni-ovulate cells of the ovary. An articulation in the petiole I find, however, more or less distinctly in *P. citrifolia* and *P. grandiflora*; and *P. monophylla* has sometimes, and *P. grandiflora* nearly always, one ovule in each cell.

The ovary in *P.* (*Arthromischus*) *armatus* is usually 3-locular, and not, I think, 4-locular, as described in the 'Enumeratio.' I am unable to find any sum of characters or single character at all sufficing to retain *Arthromischus* of generic rank. I have therefore united it with *Paramignya*, to one or two species of which it is very closely related in every respect.

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[*] Illust. Ind. Bot. i. 108.

[†] Cat. Hort. Bogon. alter, p. 216.

Luvunga.

Excepting the large trifoliolate leaves, and the inflorescences generally in abbreviated cymose racemes or panicles, there is but little difference between this genus and the foregoing. Further material may enable us to decide more satisfactorily than at present is possible, whether they should be kept separate or united. *L. eleutherandra*, Dalz., from the Western Peninsula and Ceylon, is perhaps doubtfully distinct from *L. scandens*. From the irregularity in the amount of cohesion between the filaments of the latter species, I cannot regard the free stamens of Mr. Dalzell's plant as affording, *per se*, a specific character, especially that in Ceylon we find free stamens associated with the narrow leaflets characteristic of *L. scandens*. There are probably two or three species of *Luvunga* in Borneo, judging from the imperfect specimens which I have seen.

Feronia.

I am only acquainted with the species originally described in the Society's Transactions (vol. v. p. 224) by Correa de Serra,—*F. elephantum*. In dissecting the ovary at the time of flowering, or just before, the placentas are found to separate very easily, presenting the appearance of a unilocular ovary. This slight degree of axial adhesion of the placentary partitions at so late a stage in the development of the pistil is unusual, and I do not remember to have noticed it in any of the genera which I have examined in detail. I am not sure but that, either above or below, the ovary may be unilocular at the time of flowering*.

Ægle.

I have nothing to add to the published accounts of this well-known plant, the *Bael* of India. Blume describes one species in his 'Bijdragen,' as cultivated in Java under the name of *Æ. sepiania*. So far as I can judge from his description, I agree with Messrs. Wight and Arnott in considering it doubtfully distinct from *Æ. marmelos*. Blume does not mention this latter name.

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* Roxburgh (Fl. Ind. ii. 412) says, "the germ is 1-celled, containing numerous ovula attached to 5 parietal receptacles."

GENERA AURANTIACEARUM.

§ 1. *Ovula* solitaria v. gemina.

* Stylus *brevissimus, persistens* (ovula *solitaria*).

6. Glycosmis. *Calyx* 5-partitus; lobis latis, marginibus imbricatis. *Stamina* 10, libera, alterna breviora; antheris ovatis v. ovato-oblongis.—Ramuli inermes. *Folia* 1–3-5–7-foliolata.

** Stylus *denique sejungens.*

† Embryonis (in sp. Ind.) *cotyledones* foliaceæ, contortuplicatæ.

7. Micromelum. *Calyx* 5-lobulatus v. integer. *Petala* æstivatione valvata v. subvalvata. *Stamina* 10, libera; ovula geminata, superimposita.—Inermes. *Folia* pinnata. *Inflorescentia* in cymis corymbosis terminalibus.

†† Embryonis *cotyledones* carnosæ plus minus planoconvexæ.

a Folia *pinnata v. 3-foliolata.*

2. Triphasia (sp. in Ind. cult.). *Calyx* 3-lobatus. *Stamina* 6, libera. *Ovula* solitaria.—Spinosa. *Folia* 3-foliolata. *Flores* sæpius solitarii, axillares.

3. Limonia. *Calyx* 4- v. 5-lobatus v. partitus. *Stamina* 8 v. 10, libera. *Ovarium* 4- v. 5-loculare. *Ovula* solitaria v. geminata, collateralia v. oblique superimposita.—Spinosa. *Folia* jugatim pinnata v. 3-foliolata.

4. Murraya. *Calyx* 5-fidus v. partitus. *Petala* obovato-lanceolata v. oblonga. *Stamina* 10, libera; filamentis lineari-subulatis; antheris parvis ellipticis v. rotundatis. *Ovula* solitaria v. gemina, superimposita v. fere collateralia. *Stylus* longiusculus.—Inermes. *Folia* pinnata. *Inflorescentia* terminalis sæpius cymosa multiflora.

5. Clausena. *Calyx* 4- v. 5-lobatus v. partitus. *Stamina* 8 v. 10, libera; filamentis infra dilatatis; antheris ovatis rotundatisve. *Ovula* geminata, superimposita v. collateralia.—Inermes. *Folia* pinnata. *Inflorescentia* paniculata v. racemosa.

9. Luvunga. *Calyx* cupulatus. *Petala* 4–5 oblonga. *Stamina* 8 v. 10, libera v. filamentis in tubum coalitis; antheris linearibus v. lineari-oblongis. *Ovarium* 3–4 (2) -loculare, ovulis geminatis superimpositis.

b. Folia 1-*foliolata.*

8. Paramignya. *Calyx* 5 (v. 4) -lobulatus v. lobatus. *Stamina* 10, (v. 8) libera; antheris lineari-oblongis. *Ovarium* in toro elevato æquicrasso impositum. *Ovula* solitaria v. geminata oblique superimposita.

1. Atalantia. 4–5 (in spp. Ind.) -lobatus v. partitus, v. irregulariter (temp. florifero) fissus. *Stamina* 8 v. 10, libera v. filamentis in tubum coalitis; antheris ovatis v. cordato-oblongis. *Ovarium* sæpius 2–4-loculare, ovulis solitariis v. geminatis, collateralibus.

§ 2. *Ovula* in loculis plurima.

a. Folia *unifoliolata* (in spp. Ind.).

12. Citrus. *Calyx* cupulatus v. partitus. *Stamina* 20–60, filamentis sæpius plus minus coalitis. *Ovarium* multiloculare.

b. Folia *pinnata v. trifoliolata.*

10. Feronia. *Calyx* 5 (v. 6) -lobatus. *Stamina* 10 (v. 12), libera v. basi vix coalita, æqualia. *Ovarium* 5 (v. 6) -loculare v. quasi 1-loculare.

11. Ægle. *Calyx* 4–5-lobulatus. *Stamina* 30–60, plerumque libera v. filamentis plus minus coalitis. *Ovarium* 8-multiloculare.

SYNOPSIS OF INDIAN AURANTIACEÆ, WITH A FEW NEW OR IMPERFECTLY DESCRIBED EXTRA-INDIAN SPECIES.

1. Atalantia, *Correa de Serra, Ann. du Museum,* tom. vi. 383.

Char. emend.—*Calyx* 4–5 (in *A. trimera,* 3) -lobatus vel partitus (in *A. monophylla* tempore florifero irregulariter fissus). *Petala* 4–5 (v. 3), libera (in *A. monophylla* ad tubum stam. basi sæpe adnata). *Stamina* 8 v. 10 (in *A. trimera* 6, in *A. Hindsii* circa 15), libera aut in tubum v. irregulariter coalita, subæqualia v. alterna breviora, antheris ovatis, ovato-cordatis v. oblongis. *Discus* sæpe annulatus cupulatusve, ovarii basin cingens. *Ovarium* 2–4 (rar. 3 v. 5) -loculare; ovulis pendulis subpeltatisve geminatis, collateralibus v. solitariis. *Bacca* glo-globosa, 1–5-locularis, 1–5-sperma. *Embryonis* cotyledones carnosæ v. amygdalinæ, planoconvexæ. *Frutices* vel *arbusculæ* spinosi v. inermes. *Folia* simplicia (unifoliolata). *Flores* in racemis aut fasciculis, vel rarius in paniculis parvis axillaribus cymosim dispositi, nonnunquam solitarii.

§ 1. *Calyx tempore florifero ad basin irregulariter fissus, margine scariosa plus minus erosa.* (*Stamina filamentis in tubum coalitis.*)

1. A. MONOPHYLLA, *Corr. l. c., DC. Prod.* i. 535. Ovario 4 (vel abortu 3, rar. 5) -loculari, ovulis solitariis v. geminatis.—*Wt. & Arn. Prod. Fl. Penins.* 91; *Wall. Cat.* 6353.

A. floribunda, *Wt. Ic.* iv. 1611.—A. platystigma, *Wt. Illust.* i. 108.—Limonia monophylla, *Linn. Mant.* alt. 237.—Turræa virens, *Hellen. Act. Holm.* 1788, tab. 10, fig. 1.—Trichilia spinosa, *Wild. Sp. Pl.* ii. 554; *DC. Prod.* i. 623.

α. Ovulis sæpissime solitariis.

β. (*macrophylla*) ovulis geminatis (foliis ovato-ellipticis sæpius 2–4 unc. long. 1½–2½ unc. lat.).

γ. (*carissoides*) foliis ovatis ovato-lanceolatisve, pedicellis pilosis longioribus.

Loc. Khasia (reg. trop.)! *J. D. H. & T. T.*; Madras! *Shuter*; Nilghiris! *Foulkes, Hb. Hk.*; Coimbatore, *Wight*; Ceylon! (6000 ft.), *Walker & Thwaites* (*C. P.* 1198), *Hb. Hook.*

Var. *β*, in *Hb. Helfer.*—*γ*, Segaen ripæ Irrawaddi! *Hb. Wallich.* 6354.

The stamens, normally 8, sometimes are but 5–7. When the ovary is trilocular, one cell contains a pair of ovules. The style, which is at first continuous with the ovary, after flowering abruptly separates towards the base, leaving a transverse indurated scar. The berries are 3 or 4-, or by abortion 1-seeded.

Var. *β*. *macrophylla* closely agrees with the common form, excepting in the characters indicated. The disk, however, is small and annulate.

§ 2. *Calyx* 4–5 *v.* 3-*lobatus. Stamina filamentis liberis aut in tubum v. irregulariter coalitis.*

* Flores trimeri.

[A. TRIMERA, calycis lobis triangulari-rotundatis, staminibus subæqualibus.

Triphasia monophylla, *DC.* i. 536; *Gaud. in Freyc. It. Bot.* 42. Decaisne, *Hb. Timor. Desc.* p. 111.

Loc. Timor! *ex Hb. Mus. Paris, Hb. Benth.*; Java! *Horsfield, Hb. Hook.*]

** Calyx normale 4-lobatus. Ovarium biloculare, ovulis geminatis.

2. A. RACEMOSA, *Wt. & Arn. Prod. Fl. Penins.* p. 91. Filamentis infra in tubum coalitis, *Wight. Illust.* i. 64.

Sclerostylis racemosa, *Wt. Illust.* i. 109.—S. parvifolia, *Wt. l. c.* 109. *et Icones* (sub. n. *S. atalantioides*) i. 71.—S. ovalifolia, *Wt. Illust.* 109.

Var. *floribus congestis*—*Atalantia capitellata,* Lindl. in *Wall. Cat.* 6355; *Lampetia,* Roem. Syn. fasc. i. 42.

Loc. Bombay! *Law* (Concan! *Dalzell*); Nilghiris! *Gardner*; Ceylon! *Walker & Thwaites* (*C. P.* 3673).

Some forms much resemble *A. monophylla* at first sight. Occasionally trimerous flowers are found. It is a variable plant, especially in the number and density of the flowers in the axillary racemes. In some forms the filaments are united almost quite to the apex. I have found the ovary trilocular.

3. A. CEYLANICA. Filamentis liberis v. 2 v. 3 inter se plus minus coalitis, disco annulato subcupulato, foliis ovato-lanceolatis, oblongis vel ellipticis.

Rissoa ceylanica, *Arn. Pug. Pl. Ind. Or.* 6 (324).—Sclerostylis ceylanica, *Wt. Illust.* i. 109; *Thwaites En.* p. 46.—S. Arnottiana, *Wt., l. c.*

β. (*rotundifolia*) foliis rotundatis.—*Sclerostylis rotundifolia*, Thwaites, En. Pl. Ceyl. p. 46.

Loc. Ceylon! *Walker*, *Graham* (Galle, 107! *Gardner*), *Thwaites*, *C. P.* 1196 (? Nilghiris. *Hb. Hook*).—Var. β. Ceylon! (*C.P.* 3295) *Thwaites.*

4. A. ROXBURGHII. Filamentis liberis, foliis lanceolatis utrinque angustatis sæpius longiuscule acuminatis, apice abrupte retusis marginatisve.

Sclerostylis Roxburghii, *Wt. Icones*, i. 72.—Limonia? caudata, *Wall.*—Amyris simplicifolia, *Roxb. Fl. Ind.* ii. 244, tab. (*Mus. E. I. C.*) 2478.

Loc. Churra, Khasia! *J. D. H. & T. T.*; (*Hb. Calc.* 1837, in *Hb. Griffith*).

Differs from *A. ceylanica* in its narrower acuminate leaves. The ovary rests on a short stipitiform disk, which appears scarcely so broad as its base.

*** *Calyx* 4–5-lobatus. *Ovarium* sæpius 4 (rar. 5) -loculare, ovulis geminatis.

5. A. MISSIONIS. Floribus sæpius tetrameris.

Limonia missionis, *Wight in Hook. Bot. Misc.* iii. p. 291, tab. supp. xxxiii.—Limonia? missionis, *Wall. Cat.* 6358.

Loc. Red Hills, Madras! *G. Thomson in Hb. Hook*; Ceylon! *Thwaites* (*C. P.* 1194).

**** *Calyx* 5-lobatus v. partitus. *Ovarium* 2–3 (rar. 4) -loculare, ovulis solitariis.

a. Stamina 10.

[A. NITIDA. Sclerostylis nitida, *Turcz. in Mosc. Bull.* 1858. p. 249.

Ramuli teretes, incani. *Folia* ovalia v. ovali-lanceolata, vix acuminata, apice emarginata, integra v. obsolete crenulata, glabra, parallele et crebre venosa, 1½–2½ unc., petiolo 1–2 lin. long. *Flores* in racemis cymosis, axillaribus, pauci-multifloris, ½–2 unc. longis. *Calyx* 5-partitus; lobis rotundatis, obtusis v. subapiculatis, marginibus imbricatis, ciliatis. *Petala* 5, oblonga v. elliptica. *Stamina* 10, alterna breviora, libera v. interdum filamentis irregulariter plus minus coalitis. *Discus* cupulatus, basin ovarii arcte cingens. *Ovarium* 2–3 (rar. 4) -loculare; ovulis in loc. solitariis. *Stylus* distinctus. *Stigma* 2–3 (4) -lobulatum.

Var. β. *Flores* in racemis v. sæpius in paniculis strictis, cymosis, axillaribus, apices versus ramulorum.—*Sclerostylis atalantioides*, Wt. & A.? A. Gray, U. S. Expl. Exp. i. 234.

Loc. In ins. Philippinis! *Cuming, Hbb. Hook. et Benth.* Var. β. Philippines! *Cuming,* 991, *Hbb. Hook. & Benth.*; Mangsi Island, fide *A. Gray.*]

[A. BUXIFOLIA. *Flores* parvi, subsessiles, solitarii v. in *glomerulis* parvis, axillaribus. *Stamina* 10, libera. *Ovarium* 2 (var. 3) -loculare; ovulis solitariis v. rar. geminatis.

Atalantia? bilocularis, *Wall. Cat.* 6356.—Limonia bilocularis, *Roxb. Fl. Ind.* ii. 377; tab (*Mus. E. I. C.*) 2242.—Sclerostylis atalantioides, *Wt. & Arn. Prod. Fl. Penins.* 94 (non *Wt. Icones*).—S. buxifolia, *Benth. Kew. Misc.* iii. 326; *Seemann Voy. Herald,* 369, tab. 81.—Severinia buxifolia, *Tenore, Ind. Sem. Hort. Neap.* 1840.—Helie, *Roemer. Syn. Monog.* fasc. i. 42.

Loc. Hong Kong! *Champion, Wright*; Formosa! *Wilford*; Macao! *Millet*; China! *Millet, Hance.*]

Dr. Roxburgh in his 'Flora Indica' (ii. 377) states this plant to be a native of Coromandel. Messrs. Wight and Arnott also quote Coromandel on the authority of Dr. Berry, "who sent it in 1807 to the Botanical Garden at Calcutta." They observe no one appears to have found it but Dr. Berry. I consider this alleged Indian station to have originated in some garden mistake (*vide supra,* p. 11). It is well represented in Dr. Roxburgh's Collection of Drawings (fig. 2242).

b. Stamina circa 15, irregulariter polyadelpha; ovula sæpius geminata.

[A. HINDSII.—Sclerostylis Hindsii, *Champ. in Kew Misc.* iii. 328; *Seemann, Voy. Herald.* p. 369, t. 82.—Atalantia monophylla, *Benth. in Lond. Journ. Bot.* i. 483.

Loc. Hong Kong! *Champion, Hinds, Wilford.*

The ovary seems normally bilocular, with a pair of ovules in each cell; when trilocular, one cell is uniovulate. Of *Sclerostylis venosa* (Champ. Hook. Journ. Bot. & Kew Misc. iii. 327, and Seemann, Voy. Herald, 369), I have seen only very imperfect specimens. I think it safest to consider it a variety of *A. Hindsii,* differing in the elliptical, venose leaves. obtuse at the base, and the calyx 5-merous or 4-merous.]

2. TRIPHASIA, *Loureiro Flora Cochinchinensis* (ed. 1790), vol. i. p. 152; *DC. Prod.* i. 535.

[T. TRIFOLIATA. *DC. Prod.* i. 536.

T. aurantiola, *Lour. l. c.* p. 153; *Wall. Cat.* 6381.—Limonia trifoliata, *L. Mantissa,* alt. 237.—L. diacantha, *DC. l. c.*—L. trifolia, *Burm. Fl. Ind.* (1768), p. 103, tab. 35. fig. 1.

I have seen specimens from both East and West Indies, northern states of South America, and India, but probably all from cultivated plants. It would appear to be a Chinese species, but I have not seen native specimens.]

[T. GLAUCA, *Lindl. in Mitchell's Trop. Aust.* p. 353. *Frutex* verisimiliter, ramosissimus, glaucus, spinosus. *Ramuli* teretes, glabri v. minute puberuli, spinis axillaribus, solitariis, rectis, 1–6 unc. long., armati. *Folia* simplicia (unifoliolata?), coriacea, lineari-spathulata v.

linearia, in petiol. angustata ½–1½ unc. long., 1–3 lin. lata. *Flores* solitarii v. 2–3 fascic. parvi, brevissime pedicellati. *Calyx* 3–4–5-lobatus, lobis interdum 1-2 minoribus. *Petala* 3 (interdum 4 v. 5), libera, æstivatione imbricata. *Stamina* 9–12–21, libera, subæqualia. *Ovarium* in toro carnoso, brevi-elevato, impositum, 3 (v. nonnunq. 4–5 ?)-loculare; ovulis solitariis, v. in loc. unico geminatis superimpositis. *Stylus* continuus, brevis, crassus, stigmate obtuso. *Baccæ* 2–4-loculares. *Semina* 2– ?. *Cotyledones* carnosæ, interdum inæquales, plus minus plano-convexæ. *Radicula* brevissime exserta.

Loc. In Australia subtropica! *Mitchell,* in *Hb. Hook.*; Burdekin! *Mueller.*]

[T. ? sarmentosa, *Bl. Bijd.* i. 132. *Vide supra,* p. 14 *.]

3. LIMONIA, *Linn. Gen. Pl.* 534 (1764); *DC. Prod.* i. 536.

1. L. ACIDISSIMA, *L. Sp. Pl.* (ed. 2), i. 554; *DC. l. c.*

L. crenulata, *Roxb. Cor. Pl.* i. t. 86; *Fl. Ind.* ii. 381; *Wall. Cat.* 6364. —L. ambigua, *Nutt. Sill. Journ.* v. (1822) 295.—Hesperethusa, *Roem. Syn. Monog.* fasc. i. 38.

Loc. India bor.-occid.! *Edgeworth, Hb. Benth.*; Simla!? *Thomson,* 4000 ped.; Bombay! *Getune.*; Madras! *Shuter, Hb. Hook.*; Mungyer Hills and Tetaura, *Hb. Wallich.*

Calyx 4 (v. 5)-fidus v. lobatus; lobis ovato-rotundatis v-triangularibus. *Petala* 4, libera, oblonga v. elliptica. *Stamina* 8, libera, subæqualia, filamentis subulatis; antheris cordato-oblongis. *Discus* annulatus v. brevi-stiptiformis. *Ovarium* 4-loculare; ovulis solitariis, pendulis. *Stylus* brevis, crassiusculus, ovario repente angustior, stigmate obtusiusculo. *Baccæ* globosæ, 1-4-spermæ.

Frutex spinosa. *Folia* jugatim pinnata, rachide alata. *Flores* in racemis sæpe foliatis v. fasciculis cymosis, pedunculatis, axillaribus.

Limonia? pubescens, Wall. Cat. 6365. Of this I have seen the very imperfect specimens of the Wallichian Herbarium. It seems nearly allied to *L. acidissima*; perhaps a form with the young leaves, and veins pubescent or puberulous. It is from near Toong Doong, Birma.

2. L. ALATA, *W. & Arn. Prod. Fl. Peninsula,* p. 92.; *Wall. Cat.* 6363.

Loc. Peninsula Ind. or.! *Wight.* Ceylon, ex *Thwaites, En. Pl. Zeyl.* p. 45.

Calyx 5-lobatus, lobis triangularibus. *Petala* 5, libera, æstivatione imbricata. *Stamina* 10 (v. 8), subæqualia, filamentis lineari-subulatis antheris lineari-oblongis. *Discus* parvus, annulatus. *Ovarium* 5–4-loculare; ovulis in loc. geminatis, pendulis, collateralibus v. oblique superimpositis. *Stylus* continuus, longiusculus, ovario paulo longior; stigmate capitato. *Baccæ* globosæ, circa pollicem in diam. *Semina* plurima. *Cotyledones* carnosæ, æquales v. subæquales.

Arbuscula (*fide* Thwaites) ramosa, sæpius spinosa. *Folia* trifoliolata.

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* Mr. Thwaites has kindly sent me a fragment forwarded to him from the Java Botanic Garden under the name of *Triphasia sarmentosa,* Bl. It is, as Mr. Thwaites considers it, a *Luvunga,* apparently the *L. eleutherandra,* of Dalzell. The stamens are free, the ovary bilocular, the ovules geminate, superimposed.

Limonia retusa (Don. Fl. Nep. Prod. 224), I do not know. It would appear to be an *Atalantia* from his description.

4. MURRAYA, *Linn. Mantissa*, alt. 563; *DC. Prod.* i. 537.

CHAR. EMEND. *Calyx* 5-fidus v. partitus. *Petala* 5, libera (lineari-oblonga v. obovato-lanceolata). *Stamina* 10, libera, alterna breviora; filamentis lineari-subulatis; antheris parvis, late ellipticis v. rotundatis. *Ovarium* in toro brevissimo, elevato, impositum, 2–3–5-loculare; ovulis in loculis solitariis geminatisve, superimpositis v. fere collateralibus. *Stylus* longiusculus, denique basin versus sejungens, stigmate capitato. *Bacca* 1–2-sperma. *Semina* testa glabra v. lanata. *Cotyledones* æquales, planoconvexæ. *Arbores* v. *frutices* inermes. *Folia* pinnata. *Flores* in cymis multifloris, corymbosis, terminalibus, v. paucioribus in axillis foliorum superiorum.

1. M. EXOTICA (*L. Mantissa, l. c.*) Foliis glabris, 3–8-foliolatis; calycis lobis triangularibus oblongis v. lineari-oblongis, ovario biloculari, ovulis in loculis geminatis superimpositis v. interdum solitariis.

Chalcas, *Linn. Mant.* 68; *Burman. Fl. Ind.* 104; *Loureiro, Fl. Coch. Chin.* p. 270.—Marsana, *Sonnerat, Voy.* tab. 139.

a. Floribus in cymis corymbosis multifloris.—*M. exotica*, DC. Prod. i. 537; Wall. Cat. 6368!

β. Floribus majoribus paucioribus, calycis lobis angustioribus.—*M. paniculata*, Jack. Mal. Misc. 1. n. 2. 31; DC. Prod. i. 537.—*M. Sumatrana*, Roxb. Fl. Ind. ii. 375. Wall. Cat. 6369.

Loc. a. Kumaon, 4000 ped! *Strachey* & *Winterbottom*; Assam! *Hb. Hk.*; Hong Kong! *Hb. Benth.*; Loo-choo! *Wright*; China! *Millett*; Java, *Zollinger*, 129; New Hebrides! *Milne.*

β. Peninsula Ind. or., *Hb. Wight.*; Ind. bor.-occid! *Edgeworth*; Ceylon! *Gardner, Macrae*; Banjarmassing! Borneo, *Motley.*

The extreme states of these varieties look very diverse, but they are connected by transitional links. The leaflets vary much in form and size, being lanceolate, ovate, or obovate-lanceolate, and often acuminate. In var. *β*, the flowers are sometimes nearly solitary; while in *a*, they often form close cymose corymbs. In the Wallichian Herbarium are imperfect specimens of a *Murraya* from Toong Doong, evidently allied to var. *β*. of the above, labelled *M. elongata*. Alph. DeCandolle. The leaflets are shining, acuminate, and 2 to 4 inches in length. The inflorescence would seem to have consisted of few-flowered cymes. It is perhaps but a large-leaved variety of *M. exotica.*

[*Limonia lucida* (Forst. Prod. 33). This plant is described "inermis, foliis simplicibus, pedunculis axillaribus," and as occurring at Mallicollo. Forster's specimen from that island in the herbarium of the British Museum is clearly *Murraya exotica*, var. *β*. There must be some mistake, very probably in the description.]

2. Murraya Glenieii (*Thwaites, MSS*). Ovario 5- v. 4-loculari, ovulis solitariis v. geminatis superimpositis.

Loc. Trincomalee, Ceylon! *Thwaites, Hb. Hook.*

Differing from *a* of the preceding, which it closely resembles, in the number of cells to the ovary. I almost doubt its specific distinctness, although I have always found *M. exotica* to have a bilocular ovary.

[M. crenulata. Foliis glabris 4–12 (6–10)-foliolatis, calycis lobis ovatis v. ovato-rotundatis, ovario 5-loculari, ovulis in loculis solitariis v. interdum geminatis, tunc superimpositis v. fere v. omnino collateralibus.

Glycosmis crenulata, *Turcz. Mosc. Bull.* 1858, p. 250.

Loc. Philippines, 355! *Cuming.* (Luçon) 469! *Lobb.*

Folia sæpius 6–10 unc. longa, foliolis valde obliquis, oblongo-ellipticis v. ovato-oblongis, breviter acuminatis, obtusis v. emarginatis, obsolete crenulato-serratis, sæpius 2–3 lin. long. Flores in corymbis cymosis terminalibus multifloris. Pedicelli puberuli, 2–3 lin. longi. Petala obtusa v. lineari-oblonga, medio crassiora. Stylus longiusculus, ovarium circiter æquans, cito basi v. prope basin sejungens. Fructum non vidi.]

3. M. Könighi (*Sprengel. Syst. Veget.* ii. 315). Foliis 10–20 foliolatis, calycis lobis triangularibus, ovario biloculari, ovulis solitariis v. interdum geminatis oblique superimpositis v. fere collateralibus.

Bergera Königii (*L. Mantissa alt.* p. 563; *DC. Prod.* i. 537; *W. & Arn. Prod.* 94).

Loc. Ceylon! *Thwaites* (*C. P.* 2547, 1203); Bombay, *Dalzell* (Concan! *Law & Stocks*); Bengal! *Griffith, J. D. Hooker* (Khasia and Silhet); Kumaon! *Thomson*; Ind. bor.-occ., *Royle & Edgeworth*; Sikkim! 1000–2000 ped., *J. D. Hooker.*

This well-known species has been very fully described. For notice of its occasionally biovulate condition, *vide supra*, p. 15. Frequently cultivated.

(*M.? longifolia.* Bl. Bijd. i. 137. This Java plant is quite unknown to me. Blume speaks of its flowers as racemose, and the stigma as sessile. It must be a very doubtful associate of *Murraya.*)

5. Clausena, *Burm. Flor. Ind.* p. 87. *DC. Prod.* i. 538.

Calyx 4–5-lobatus v. partitus. *Petala* 4–5, libera, sæpius tenera elliptica v. rotundata, æstivatione marginibus imbricata. *Stamina* 8–10, libera, alterna paulo breviora; filamentis medio v. infra dilatatis, sæpe fornicato-concavis, apice subulatis; antheris ovatis v. ellipticis, v. rotundato-ellipticis. *Ovarium* 4–5-3 (rarius 2)-loculare; ovulis geminatis, superimpositis v. collateralibus. *Stylus* sæpius distinctus, denique sejungens. *Bacca* (§ 1) 5 v. 4, v. (§ 2) abortu, 1–2 locularis. *Embryonis* cotyledones æquales, plus minus planoconvexæ. *Arbores frutices* v. *suffrutices*, inermes, foliis pinnatis. *Inflorescentia* terminalis v. axillaris, paniculata v. laxe racemosa, floribus sæpius cymosim aggregatis.

§ 1. *Flores tetrameri* (in *C. brevistyla* et *C. heptaphylla* interdum pentameri.)

* *Inflorescentia terminalis, paniculata.*

1. C. PENTAPHYLLA (? *DC. Prod.* i. 538; *Don. Gen. Syst.* i. 586). Foliis 3–5–7-foliolatis, ovario piloso, stylo fere glabro brevissimo.

Amyris pentaphylla? *Roxb. Fl. Ind.* ii. 247.—'A. pentaphylla, *Roxb.*'; *Wall. Cat. ex Hort. Bot. Calc.*!——? Limonia? *mollis. Wall. Cat.* 6362.*

Loc. India bor.-occidentali! *Edgeworth, Hb. Benth.* Prope Cawnpore. *fide Roxb. l.c.* p. 248.

Frutescens (fide *Roxb.*). *Ramuli* breve v. scabride pubescentes. *Folia* 6–12 unc. *Foliola* utrinque in nervis sæpius pubescentia, pagina sup. denique fere glabra v. glabrescens, 4–8 unc. longa, ovali- v. ovato-elliptica, vix acuminata, apice obtusiuscula, retusa v. emarginata, margine plus minus obsolete undulato-crenulata. *Panicula* 2–10 unc., ramis breve hirsutis. *Pedicelli* brevissimi, 1 lin. et infra. *Calyx* 4-lobatus, v. dentato-lobatus. *Petala* 4 extus plus minus pilosa v. fere glabra. *Stamina* 8, alterna parum breviora; filamentis medio dilatatis, apice subulatis. *Ovarium* stipitatum, 4-sulcatum, pilosum, 4-loculare; ovulis geminatis superimpositis, stipite glabro v. subglabro. *Stylus* brevissimus, crassiusculus, ovarium æquans v. eodem brevior. Stigma 4-lobulatum, subcapitatum v. fere æquilatum. *Bacca* (fide *Roxb. l. c.*) ovata, obtuse apiculata, monosperma.

The plant distributed by Dr. Wallich under 8519 A. certainly looks somewhat different from Mr. Edgeworth's specimens, though I am unable to distinguish them specifically. The leaflets are fewer and, proportionally, considerably larger, less pubescent, and thinner in texture.

The inflorescence of Dr. Wallich's plant is smaller, and its ramifications more slender. Dr. Roxburgh states in 'Flora Indica,' *l. c.* p. 248, that there are "many ovula" in each cell of the ovary. This, I think, must be an error. I identify his plant by the Wallichian specimen,—which is the *Amyris pentaphylla* of the Calcutta garden,—as well as by Dr. Roxburgh's figure in the East India Company's drawings, and his description, apart from this item of the ovules.

2. C. HEPTAPHYLLA, *Wt. & Arn. Prod. Flor. Penins.* p. 95 (in annot.). Foliis 7 (5–9) -foliolatis, foliolis basi fere æqualibus v. leviter obliquis, ovario plus minus obovato 4-sulcato-lobulato glabro, glandulis immersis sæpe mammillato, stylo ab ovario distincto subæquilongo, stigmate æquilato.—*Wall. Cat.* 8508.

Amyris heptaphylla, *Roxb. Flor. Ind.* ii. p. 248, et tab. (*Mus. E.I.C.*) 1054.

Loc. Circ. Calcuttam, *fide Roxb. l. c.*; Silhet! *Wall. Hb.*; Khasia, 0–4000 ped., et Chittagong! *J. D. H. & T. T.* (? var. pubescens, Cookia? macrophylla, *Ldl.*, *Wall. Cat.* 6367, ripa fl. Saluen).

Frutex.—*Folia* 6–16 unc. longa. *Petioluli* 1½–2 lin. long. *Foliola* mag. variabili, terminalia sæpe majora, 2½–4 (–6) unc. longa 1–1¾ (–3¼) unc. lata; ovalia v. ovato-lanceolata, plus minus acuminata, apice obtusiuscula v. subacuta, margine obsolete repando-denticulata v. crenulata, supra glabra v. secus costam venulasque leviter pubescentia. *Panicula* terminalis ramis patentibus, cymosim di-trichotomis. *Pedicelli* brevissimi, 1 lin. vix exced. v. breviores. *Calyx* lobis ovato-triangularibus v. rotundatis. *Ovarium* breve et anguste stipitatum. *Ovula* superimposita. *Bacca* jun. oblonga, 1-sperma.

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* Very probably a true synonym, but the only specimen in *Hb. Wallich.* is a poor one. It is from Oude.

The flowers are sometimes pentamerous. Distinguished from other terminal-panicled *Clausenæ* by the obovate, sulcate, glabrous ovary, often glandular, and the style about equal to it in length.

[C. BREVISTYLA, sp. n. Foliis 10–15-foliolatis, foliolis valde obliquis, ovario plus minus obovato basi angustato sursum 4-lobulato glabro v. fere glabro, stylo ab ovario distincto, brevissimo, ovario dimidio breviore, stigmate æquilato.

In 'Hope Islets!' *M'Gillivray, Hb. Hook.*

Frutex? *Folia* 5–8 unc. longa. *Petioluli* circa 2 lin. longi. *Foliola* oblique v. rhomboideo-ovalia v. ovata, apice vix acuminata, emarginata, margine undulato-crenata v. dentata, glabra v. in junioribus secus costam pubescentia, 1–4½ unc. long., 10 lin.–1½ unc. lata. *Calyx* 4–5-fidus, lobis late ovatis. *Petala* 4–5, tenera, late elliptica v. rotundata. *Stamina* sæpe 10, filamentis infra crassioribus, dilatatis, subfornicatis. *Ovarium* glabrum, vel pilis paucis instructum, 4–5-loculare. *Ovula* geminata (superimposita?). *Stigma* stylo æquilatum. *Fruct.* non vidi.

Resembles *C. heptaphylla* very closely, differing in the conspicuous obliquity of the leaflets and the very short style, inserted in both species in the central apical depression of the ovary. The flowers are often pentamerous.]

3. C. EXCAVATA, *Burm. Flor. Ind.* p. 87. Foliis multi (15–30)-foliolatis, foliolis basi obliquis, ovario anguste stipitato subtetragono ovato v. elliptico piloso v. hirsuto, stylo basi ab ovario vix abrupte distincto crassiusculo ovarium sæpe æquante.—*DC. Prod.* i. 538.

Murraya Burmanni, *Sprengel. Syst. Veg.* ii. 315.—Amyris (Clausena, *W. & A. Prod. Fl. Penins,* p. 95) sumatrana, *Roxb. Fl. Ind.* ii. 250. —A. (Clausena, *W. & A. l. c.* p. 95) punctata, *Roxb. l. c.* p. 251.— Cookia graveolens, *Wt. & Arn. Prod.* p. 95; *Wall. Cat.* 8515.

Loc. Sikkim! 2000 ped., *J. D. H.*; Silhet! Penang et Rangoon! *Hb. Wall.*; Malacca! *Griffith*; Java! *Lobb., Horsfield & Zollinger,* 447 *in Hb. Hk.*; Banjarmassing, Borneo! *Motley,* 279, *Hb. Hk.*—Var. β, foliolis angustioribus, Bhotan! *Griffith.*—Var. γ, breve pilosa, Rangoon! *M'Clelland, Hb. Hk.*

Folia 6–15 unc. longa. *Petioluli* sæpius 1–1½ lin. *Foliola* basi valde obliqua, lanceolata v. ovato-lanceolata, sæpe acuminata, apice obtusa v. fere acuta, margine obscure undulato-crenulata, plus minus pubescentia v. interdum supra glabrescentia, sæpius $1\frac{1}{2}$–$2\frac{1}{2}$ unc. longa, 8–12 lin. lata (in var. β 4–7 lin. lata). *Panicula* elongata v. pyramidalis, folia superans v. iisdem brevior. *Flores* subsessiles v. brevissime pedicellati. *Calyx* 4-rotundato-lobulatus v. lobis ovato-triangularibus. *Petala* tenera, elliptica v. rotundata. *Stamina* subæqualia v. alterna parum breviora, filamentis infra dilatatis concavo-fornicatis. *Ovarium* 4-loculare, ovulis geminatis, superimpositis; *disco* ad ovarii stipitem accreto, sæpius glabro. *Stylus* demum basi sejungens, glaber, 4-sulcatus v. tetragonus, stigmate æquilato v. vix latiore. *Bacca* glabra v. sparse pilosa, 1-sperma.

Distinguished by the hairy ovary, which is ovate or elliptical, not depressed in the apex. The style often seems almost narrowed gradually from the ovary. The leaflets are often very numerous.

** Inflorescentia axillaris, paniculata, v. racemosa. (Flores tetrameri, in *C. Willdenovii* rarius pentameri.)

a. Species extra-Africanæ.

4. C. Willdenovii, *W. & Arn. Prod. Fl. Penins.* p. 96. Foliolis 5–9–13 basi plus minus obliquis, floribus cymosis in paniculis subracemosis v. racemis, pedicellis gracilibus, ovario breviter et anguste stipitato plus minus 4-sulcato v. tetragono glabro, stylo crassiusculo ovarium æquante v. paulo excedente, bacca rotundata 1–2 sperma.

C. pubescens, *W. & Arn. l. c.*—Amyris dentata, *Willd. Sp. Pl.* ii. 337.

β (*nana*). Foliis minoribus, inflorescentia racemosa.—*C. nana*, W. & Arn. *l. c.*—*Amyris nana*, Roxb. Fl. Ind. ii. p. 249, et tab. (Mus. E.I.C.) 1408.

Loc. Concan! *Stocks*; Madras! *Shuter*; Nilghirisi! *Hb. Hk.*; Ceylon! *Thwaites* (*C. P.* 1204) *& G. Thomson.*—*Forma pubescens*, Ceylon! *Thw.* (*C. P.* 2546).—Var. β, Nilghiris, *Hb. Hk.*

Frutex v. fruticulus. Ramuli glabri v. breviter pubescentes. *Folia* $2\frac{1}{2}$ (var. *nana*) –12 poll. longa glabra v. pubescentia. *Foliola* subsessilia v. petiolulata (0–2 lin.), oblique ovata v. ovato-lanceolata, sæpius acuminata, apice obtusiuscula v. minute emarginata, margine crenulata, 2–3 unc. longa (in var. *nana* $\frac{3}{4}$ unc.), 4 lin.–$1\frac{1}{2}$ unc. lata. *Flores* inferiores in cymis 3-floris laxis, v. 1-floris, interdum in racemis dispositis. *Pedicelli* 1–5 lin. longi. *Calyx* 4 (rar. 5) -partitus v. lobatus, lobis plus minus ovatis. *Stamina* 8, filamentis infra dilatatis, subfornicatis. *Ovarium* superne 4-lobulatum v. sulcatum, 4-loculare, ovulis superimpositis. *Bacca* rotundata, subsicca, pisi magnitudine *.

A variable plant. Some forms, especially of var. *nana*, much resemble *Clausena inæqualis* of Southern Africa. The inflorescence in this species is always axillary: when paniculate the flowers are disposed in small lateral cymes; in var. *nana* it is often reduced to simple racemes, with the flowers on slender, rather long pedicels.

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* Lieut. Beddome has favoured me with specimens of this *Clausena* from the Anamallay Hills, where it bears a delicious fruit—somewhat similar, I think in size to that of the Wampi.

5. C. SUFFRUTICOSA, *Wt. & Arn. Prod. Fl. Penins.* p. 96 (in annot). Foliis 11–17-foliolatis, floribus in paniculis laxis racemosis v. in racemis, pedicellis gracilibus cymosim subumbellatim v. subverticillatim dispositis, ovario glabro, ovato v. subsphærico v. sulcato, stylo ovarium æquante v. paullulo excedente.—*Wall. Cat.* 8514.

Amyris suffruticosa, *Roxb. Fl. Ind.* ii. p. 250, et tab. (*Mus. E.I.C.*) 1409.

Loc. Chittagong, *fide Roxb. l. c.*

Suffrutex (fide Roxb.).—*Ramuli* breve pilosi denique glabrescentes. *Folia* 12–16 poll., rhachide breve pilosa v. pubescentia. *Foliola* subsessilia v. breviss. petiolulata, plus minus obliqua, oblonga v. ovato-oblonga, v. terminali rhomboideo-elliptica, plus minus acuminata, apice acutiuscula v. obtusa, pubescentia v. pagina sup. demum glabrescentia, sæpius 2–4 unc. long., 1–1¾ lata. *Paniculæ* v. racemi 3–6 poll. long., apicem versus ramulorum in axillis foliorum, foliis breviores. *Pedicelli* breve et patente pilosi, 1½–2 lin. *Calyx* 4-partitus, lobis ovatis. *Petala* 4, tenera. *Stamina* 8, filamentis infra medium dilatatis subfornicatis. *Ovarium* brevissime stipitatum, glabrum, glandulis immersis minute mamillosum, 4-loculare, ovulis superimpositis. *Bacca* (fide Roxb.) dependens, fusiformis v. ovalis, aurantiaca, fere poll. longa, 1-sperma.

Near to *C. Willdenovii*, from which its more numerous leaflets, rounded ovary and more slender style, and the form of the fruit, appear chiefly to distinguish it.

b. Species Africanæ.

[C. INÆQUALIS, *Benth. Flor. Nigrit.* p. 257. Foliolis 9–15–17 rhomboideo-ovatis, floribus in racemis laxis aut paniculis racemosis foliis sæpius brevioribus, ovario glabro 4–2-sulcato 3–4–2-loculari, ovulis geminatis fere collateralibus, stylo ovarium vix excedente, baccis rotundatis 1-spermis.

Myaris inæqualis, *Harvey & Sonder, Fl. Cap.* i. p. 444, cum syn.

Var. β. Foliolis parvis angustioribus.

Loc. C. B. S.! *Miller, Harvey*; Natal! *Peddie, Hb. Bth.*; Cape Coast! *Vogel, Hb. Hk.* (sub n. *Cl. anisata*).

Frutex v. arbor, parva, 10–20-ped. *Ramuli* pubescentes denique glabrescentes. *Folia* 3–5-poll.; foliolis inæquilateralibus, interdum apicem versus leviter angustatis, apice obtusis v. subemarginatis, crenulatis, ½–1½ unc. longis, 3–12 lin. latis. *Pedicelli* 1–2 lin. longi. *Calyx* 4-partitus, lobis ovatis v. triangulari-ovatis. *Stamina* 8, alterna paulo breviora. *Ovarium* brevi-stipitatum, 2–4-gonum v. sulcatum; ovulis brevissime funiculatis. *Stigma* lobulatum, stylo equilatum. *Bacca* 1-sperma, rotundata v. elliptica, pisi magnitudine.

Harvey and Sonder, *l. c.*, state the ovary to be 3-celled; it commonly is so, but varies with 4 or 2 cells. Vogel's plant from Cape Coast (*C. anisata*, Hk. fil. Flor. Nigrit. p. 256) appears identical with some forms of this species.]

[C. ANISATA (*non Hk. fil.*). Foliolis 10–20, paniculis laxis elongatis foliis brevioribus v. longioribus, ramulis lateralibus cymosim divaricatis gracilibus pubescentibus, ovario 4-sulcato 4-loculari, ovulis geminatis oblique superimpositis v. fere collateralibus.

Amyris anisata, *Willd. Sp. Pl.* ii. p. 337.—Fagarastrum anisatum, *Don. Gen. Syst.* ii. p. 87.

Loc. Abbeokuta! *Irving*; Idda, ad fl. Niger! *Barter in Hb. Hook.*

Suffrutex 3-pedalis, floribus albis. *Folia* 6–12 poll.; foliolis inæquilateralibus, oblique ovatis v. ovato-oblongis, obscure crenulatis, interdum leviter acuminatis v. emarginatis, pubescentibus. *Paniculæ* 6–9 unc. longæ, elongatæ, in axillis foliorum superiorum. *Pedicelli* 2–3–1 lin. longi. *Bracteolæ* minutæ, ovatæ v. lanceolatæ. *Calyx* 4-partitus, lobis ovatis. *Stamina* filamentis medio abrupte dilatatis, sursum subulatis. *Ovarium* breve stipitatum, glabrum. *Stylus* longiusculus, crassiusculus, 4-sulcatus, basi sejungens.

Differs from *C. inæqualis* in the much larger foliage and more paniculate inflorescence. I have not seen fruit.]

§. *Flores sæpissime pentameri. Inflorescentia paniculata, terminalis.*

* Ovula superimposita.

[C. WAMPI, *Blanco, Flor. Fil.* p. 358. Ovario fasciculato-piloso 5-loculari, stylo brevi ovario vix æquilongo.

Cookia punctata, *Sonnerat. Voy.* ii. p. 130. t. 131; *DC. Prod.* i. p. 537.

Loc. In India cult. in hortis. Species verisimiliter Chinensis.

Arbor v.Arbuscula.—Ramuli primum breve pubescentes v. puberuli. *Folia* 5–7–9-foliolata, 8–10 poll. *Foliola* ovato-elliptica, lanceolata v. ovata, petiolulata (1–3 lin.); basi plus minus obliqua, apice obtusa v. subemarginata, interdum quasi mucronulata, vix acuminata, margine undulato-crenulata v. obsolete serrulata, demum glabra v. glabrescentia, in costa autem venisque pag. inf. sæpius sparse scabrida v. puberula, terminali sæpe 2½–4 poll. long. *Flores* subsessiles v. brevissime pedicellati, in paniculis multifloris cymosim dispositi. *Calyx* 5 (interdum 4) -partitus, lobis triangularibus v. ovatis. *Petala* 5, æstivatione parum imbricata. *Stamina* 10, alterna paulo breviora, filamentis infra medium dilatatis, complanatis, supra subulatis; antheris oblongis v. ellipticis basi cordato-sagittatis, glandula dorsali instructis. *Ovarium* breve stipitatum, glandulosum, sæpissime 5-loculare, ovulis geminatis, superimpositis, superiore lateraliter v. basin prope peltato, inferiore subpendulo. *Stylus* brevissimus, distinctus, sursum glaber, stigmate 5-lobulato, stylo vix latiore. *Bacca* sæpius 5-locularis, 5-sperma v. abortu 1-sperma v. sterilis, ovato-globosa, pubescens, 1 unc. et infra. *Cotyledones* carnosæ, æquales.

In reducing this plant to the genus *Clausena*, I have adopted the specific name *Wampi* (from its vulgar appellation) after Blanco. To retain the name *punctata* might lead to confusion with *C. punctata* of Wt. & Arn.,

which latter, however, I refer to *C. excavata*, Burm. I have only seen cultivated specimens from India and the Mauritius. It is probably a native of Southern China, as stated by Retzius. Loureiro did not find it wild in Cochin China, nor Blanco in the Philippines. Hasskarl and Miquel have confused *Micromelum* with this well-known species; the latter gives the Moluccas, Timor, and Java as localities. It is probably introduced.]

[C. (sp. nova ?). Ovario glabro 5-loculari, ovulis superimpositis, stylo pentagono ovario æquilongo, foliis inflorescentiaque plus minus hirsutis.

Loc. Philippines! *Cuming*, 1872, *Hb. Hook.*

Ramuli inflorescentiaque cinnamomeo-velutino-pilosi. *Folia* 11–21-foliolata, 12–20 poll. *Foliola* petiolulata (1½–3 lin.), valde obliqua, rhomboideo-lanceolata v. ovato-lanceolata, leviter acuminata, margine obsolete crenulata, utrinque præcipue ad costam nervasque sparse pilosa v. hirsuta. *Panicula* hirsuta, 15–17 poll., valde ramosa, floribus in cymis aggregatis, brevissime pedicellatis v. sessilibus. *Calyx* profunde 5-lobatus, lobis ovatis vix acutis. *Petala* elliptica, navicularia, submembranacea, glabra. *Stamina* 10, filamentis glabris, infra dilatatis crassioribus, sursum subulatis; antheris glandula instructis. *Ovarium* brevissime stipitatum, obovatum. *Ovula* geminata, superimposita, superiore fere peltato, infer. subpendulo, funiculato. *Stylus* basi leviter constrictus, mox sejungens.

I have not seen the fruit. Very like the *Wampi*, from which its much longer and narrower leaflets, glabrous ovary, and longer style, distinguish it.]

6. C. WALLICHII. Foliis 13–17-foliolatis, ovario glabro 5-loculari, stylo distincto ovario breviore v. vix æquilongo, foliolis acuminatis glabris.

Bergera Wallichii, *A. DC. MS. in Hb. Wallich.*

Loc. Chapedong Hill, Birma! *Hb. Wallich.*

Folia rachide leviter alata, foliolis rhomboideo-lanceolatis oblongisve, acuminatis, margine crenulatis, glabris. *Inflorescentia* paniculata, multiflora, ramulis strictis, floribus parvis. *Calyx* 5-partitus, lobis ovatis. *Petala* 5, margine leviter æstivatione imbricata, tenera. *Stamina* 10, libera, filamentis medio crassioribus, primum infra leviter subfornicatis. *Ovarium* breve anguste stipitatum, 5 (v. 4) -loculare, ovula oblique superimposita. *Stylus* brevissimus, sulcatus, stigmate æquilato.

When the ovary is 4-locular, the ovules in one cell at least appear to be truly collateral. This plant thoroughly unites the genera *Piplostylis* and *Clausena*: and not only does it closely bind these genera, it much weakens also the generic distinctness of *Murraya*, some species of which are mainly to be distinguished from pentamerous species of *Clausena* by the proportionally elongated style, more capitate stigma, form of inflorescence, larger flowers with narrower petals, and perhaps in the less stipitate ovary and disk.

** Ovula collateralia.

7. C. INDICA, *Dalzell in Kew Misc.* iii. p. 33, t. 2. Foliis 7–11-foliolatis, ramulis floriferis inferioribus strictis adscendentibus plus minus elongatis, calyce 5-fido v. partito, lobis late ovatis v. ovato-rotundatis, ovario 3- (interdum (4–5–2-) -loculari.

Bergera nitida, *Thw. En. Pl. Zeyl.* p. 46.

Loc. Bombay! *Dalzell, Hb. Hook.*; Ceylon! *Walker* (Hantam, 3000 ped.), *Gardner, Thwaites* (C. P. 2421).

Frutex v. arbor mediocris (fide Dalzell & Thwaites).—*Ramuli* puberuli. *Folia* sæpius 6–10 unc. *Foliola* obliqua, elliptica v. ovato-lanceolata v. lanceolata, $1\frac{1}{4}$–3 unc. long., subcoriacea, crenulata v. integra, obtusa, sæpe leviter acuminata, glabra, v. costa minute puberula. *Pedicelli* brevissimi, $\frac{1}{2}$–1 longi. *Flores* parvi. *Petala* oblonga v. elliptica. *Filamenta* infra leviter dilatata, complanata. *Ovarium* globosum v. oblongum, glabrum, glandulis numerosis papillosum. *Bacca* 1-sperma, sphærica, pulposa, flava (*fide Thwaites*).

[C. —— ? Foliis 6–9-foliolatis, ramulis floriferis secundariis sæpius brevissimis, calyce 5–4-lobato, lobis ovato-triangularibus, ovario 5-loculari.

a. (*glabra*). Java! *Zollinger, Hb. Hook.*

β. (*pubescens*). Java! *Horsfield, Hb. eod.*

Suffrutex (v. frutex?) pubescens v. glaber. *Folia* 6–9 unc. *Foliola* ovalia v. plus minus ovata, vix obliqua, apice obtusa v. emarginata, obsolete crenulato-serrata v. integra, glabra v. sparse pilosa vel pubescentia. *Panicula* terminalis parva, floribus subsessilibus v. brevissime pedicellatis, cymosim aggregatis. *Ovarium* ovato-rotundatum, supra 5-lobulatum. *Stylus* brevissimus, 5-sulcatus, crassus.]

6. GLYCOSMIS, *Correa de Serra, Ann. du Museum*, tom. vi. 384; *DC. Prod.* i. 538.

Calyx 5-partitus; lobis latis, marginibus imbricatis. *Petala* 5, libera, oblonga v. elliptica v. rotundata, æstivatione imbricata. *Stamina* 10, libera, alterna breviora, filamentis infra plus minus dilatatis, sursum subulatis; antheris ovatis v. oblongis, parvis (sæpe glandula dorsali v. apicali instructis). *Ovarium* in toro discoideo vel brevissime stipitiformi impositum, 5–4–3–2-loculare; ovulis in loc. solitariis, pendulis. *Stylus* brevissimus, cum ovario continuus (sæpe fere æquicrassus), persistens, stigmate æquilato v. vix latiore. *Bacca* succoso-pulposa v. subsicca, 1 (nonnunquam 2–3)-sperma. *Cotyledones* carnosæ, æquales. *Radicula* brevissima.—*Arbores* v. *frutices* inermes. *Folia* pinnata v. simplicia (unifoliolata). *Flores* sæpius in paniculis cymosis axillaribus v. nonnunquam terminalibus, parvi.

1. G. PENTAPHYLLA, *Correa, l. c.* 384. Foliis 3–5–1-foliolatis, ovario 5 (interdum 4, rariss. 3) -loculari glabro, stylo brevissimo crasso. *DC. Prod.* i. 538.

G. arborea, *DC. l. c.*—? Limonia pentaphylla, *Retz. Obs.* v. 24.—L. pentaphylla (Tab. 84), and L. arborea (tab. 85), *Roxb. Cor. Pl.*

Species maxime polymorpha quum characteribus tum habitu.

Var. *a*. Foliis sæpius 3 (1–5) -foliolatis, foliolis lanceolatis oblongo- v. obovato-lanceolatis integris v. obsolete crenulatis 4-9 unc. longis, paniculis sæpe elongatis, multifloris, apicem versus ramulorum dispositis, ovario sæpius glandulis elevato-mammillato 5-loculari, disco ad basin ovarii connato.

Subvar. 1. Foliolis angustioribus.

Var. *β*. Foliis sæpius 3–5-foliolatis (in subvar. 1. 1-foliolatis), foliolis ellipticis v. elliptico-lanceolatis, paniculis parvis pauci-multifloris (floribus minoribus), ovario 5 (in spp. Austral. sæpius 4) -loculari vix glandulis mammillato, basi ab gynophoro brevissimo incrassato per constrictionem distincto.—*G. triphylla,* Wight in Hook. Bot. Misc. iii. 298. tab. supp. 39; Wt. & Arn. Prod. 93.—*G. nitida.* Wt. & Arn. *l. c.*

Subvar. 1 (*longifolia*). F. sæpe unifoliolatis, lamina oblonga v. obovato-lanceolata sæpius acuminata, 3–10 unc. longa, paniculis brevibus 1–2 unc. v. (terminalibus) 3-4 unc.

Subvar. 2 (*Chinensis*). F. 2-3- sæpe 1-foliolatis, foliolis oblongo-lanceolatis v. lanceolatis 2–4 unc. long. $\frac{3}{4}$–$1\frac{3}{4}$ unc. latis, ovario 5 (v. 4 v. 3)-loculari, paniculis plerumque $\frac{1}{2}$–$1\frac{1}{2}$ unc.—*G. citrifolia,* Ldl. in Hort. Soc. Journ. i. 72.—*G. heterophylla,* A. Rich. in Sagra, Hist. Cuba; Bot. i. 231.—*G. americana,* Sagot. MS. in Hb. Benth.—*Limonia citrifolia,* Willd. Enum. 448; DC. Prod. i. 536.—*L. parviflora,* Bot. Mag. 2416. Forma occurrit foliis 1-foliolatis, 4–6 unc. long., $1\frac{1}{2}$–$2\frac{1}{2}$ lat.

Subvar. 3. (*macrophylla*). F. 3–5-foliolatis (foliolis $3\frac{1}{2}$–6 unc.) v. 1-foliolatis (8–12 unc. long. $2\frac{1}{2}$–4 unc. lat.), disco crassiore ovario latiore.—*G. macrophylla,* Ldl. in Wall. Cat. 6377.

Subvar. 4 (*angustifolia*). Foliolis angustioribus lanceolatis $1\frac{1}{2}$–3 unc. long. 4–8 lin. lat.—*G. angustifolia,* Ldl. in Wall. Cat. 6378.

Subvar. 5. Paniculis axill. brevissimis, constrictione inter ovarium et gynophorum inconspicua, stylo ovarium æquante.

Loc. Var. *a*. India bor.-occid.! *Edgeworth*; Kumaon! 2000 ped., *Strachey* & *Winterbottom*; Khasia! Assam! Rohilcund! *T. Thomson*; Kurg! Nilghiris! *Gardner*; Tavoy, *Helfer* & *Wall. Cat.* 6373; Bamo! *Hb. Griffith*; Mergui! *Griffith*; Pegu! *M'Clelland*; Ceylon! *Walker*, *Thwaites* (*C. P.* 180), prope Mangalore! *Pl. Hohen,* 393.

Subvar. 1. Canara et Mysore! *Law.*

Var. *β*. Madras, *Wight*, *Shuter*; Mysore, *Hb. Hook*; Ceylon! 6000 ped., *Walker*, 2–3000 ped., *Gardner*, *Thwaites* (*C. P.* 1192).

Subvar. 1. Assam! *Jenkins*; Khasia! *J. D. H.* & *T. T.*; Rangoon! *M'Clelland.*

Subvar. 2. Hong Kong! *Wilford, Wright*; Philippines! *Cuming*;

Banjarmassing, Borneo! *Motley*; Java, *Horsfield*. (Ind. occid. et Guiana, *cult.*)

Subvar. 3. Penang! Tavoy! *Hb. Hk.*

Subvar. 4. sine loc. in *Hb. Wall.*

Subvar. 5. Silhet! *Wall. Hb.* 6374; Khasia,! 1–4000 ped., *J. D. H. & T. T., Griffith.*; Chittagong et Cachar! *J. D. H. & T. T.*; Sikkim! 4-7000 ped., *J. D. Hook.*

The extreme forms of this most protean species are so dissimilar, that were they not united by almost all gradations, I should not have dreamt of uniting them. The collection of specimens illustrating these forms in the Kew Herbaria is very large, enabling me to dissect and compare a great amount of material. Roxburgh himself observes ('Pl. Coromandel,' i. 60) that the chief difference between his *L. arborea* and the *L. pentaphylla* of Retzius consists in the serrated leaves of the former. I certainly do not find any important character in the margination of the leaves authorizing me to separate them. The secondary veins and general venation are more decidedly marked in var. *a* than in var. *β*, and the leaves are, perhaps, less coriaceous in texture; but in subvar. *Chinensis* we have the leaves of the former with the pistil of the latter. I am not sure if the two forms figured by Roxburgh (Cor. Pl. i.) answer to my two races or are both referable to one. Mr. Thwaites, who has most obligingly favoured me with his valuable opinion on some of the important changes which I have proposed in this essay, is of the opinion that the *G. arborea* and *G. pentaphylla* of his 'Enumeratio' may be safely united. The differential characters to which he called attention in that work he does not find so constant as he had believed them to be.

2. G. BILOCULARIS, *Thwaites, En. Pl. Zeyl.* 45. Foliis 3–5-foliolatis, ovario biloculari glabro in disco incrassato brevi imposito.

Loc. Ceylon! (Maturatte District), *Thwaites* (*C. P.* 3362).

Frutex. (fide Thw. l. c.). *Foliola* lanceolata v. anguste trapezoideo-lanceolata, leviter acuminata, apice obtusa, subtus pallidiora, 1¾–2½ unc. longa, 5–8 lin. lata. *Panicula* axillaris, brevissima, pauciflora. *Calyx* lobis late ovatis v. triangulari-ovatis. *Petala* oblonga v. elliptico-oblonga. *Stamina* alterna breviora,—fide *Thwaites* 'multum et irregulariter dilatata;' antheris parvis, cordatis. *Discus* brevis, crassus, ovario paulo latior.

Of this species I have seen but a specimen in the British Museum Herbarium, and a small one which Mr. Thwaites kindly sent me with a letter. It appears a distinct species. The axillary inflorescences are extremely reduced, in my specimen hardly ¼ in. in length. The leaflets are also small.

3. G. SAPINDOIDES, *Lindley in Wall. Cat.* Foliis 5–7-foliolatis, paniculis racemosis nisi a basi vix ramosis, ovario 2 (v. interdum 3)-loculari, ferrugineo-piloso, stylo crasso subæquilongo.

Loc. Penang! *Wall. Cat.* 6376; Java! *Horsfield*! (var.? Australia bor.-occid.! *A. Cunningham in Hb. Hook.*).

Rami teretes, glabri. *Folia* 10–15 poll. *Foliola* lanceolata v. oblonga, leviter acuminata, 3–8 unc. longa, 1½–2½ unc. lata. *Flores* brevissime pedicellati v. sessiles. Paniculis v.- racemis cymosis parvis, 1–2 unc. in axillis foliorum superiorum quasi terminalibus. *Calyx* lobis ovato-rotundatis. *Petala* oblonga v.anguste oblonga. *Discus* parvus, vix ullus. *Ovarium* brevissime stipitatum. *Stylus* crassus, ovario fere æquilongus.

The panicles are branched only or chiefly near the base; the few flowers being disposed in very small, almost sessile glomerules, or singly on the branches of the inflorescence.

There is another *Glycosmis* in Dr. Horsfield's collection, probably allied to this plant, but I have had imperfect material for examination. The leaves are trifoliate, leaflets 6–9 ins. by 2–3 ins. The petals are linear oblong and ovary glabrous.

4. G. PUBERULA, *Lindley in Wall. Cat.* Foliis sæpius 3-foliolatis, ovario 5- v. 4-loculari brevissime stipitato oblongo ferrugineo-piloso.

Loc. Penang! *Wall. Cat.* 6375.

Foliola 2–4 unc. longa, ¾–1½ lata. *Pedicelli* brevissimi v. 0-1½ lin. longi. *Discus* parvus ad stipitem adnatus. *Stylus* brevissimus.

An var. *G. pentaphylla*, cui valde proxima, differt præcipue ovario piloso.

(G.? AFRICANA, *Hk. fil. Flora Nigrit.* 256. As observed above (p. 11) the only specimen which I have seen is so imperfect that I cannot tell whether it is truly a *Glycosmis* or not.

In Sir William Hooker's Herbarium there is a doubtful *Glycosmis* from S. Borneo, sent by the late Mr. Motley; it is not sufficient for description, but the elongated flowering axes look rather peculiar. I think it may be a variety of *G. pentaphylla*, allied perhaps to the Chinese form of that species.)

7. MICROMELUM *Blume*, '*Bijdragen*,' i. 137.

Calyx 5-dentatus v. triangulari-lobulatus v. integer. *Petala* 5, libera, crassiuscula, æstivatione (marginibus sæpe oblique) valvata, v. vix imbricata. *Stamina* 10, libera, alterna breviora; filamentis lineari-subulatis (v. linearibus apice subulatis). *Ovarium* toro brevissimo insidens, 5–4–3 (rar. 6–7–2)-loculare, dissepimentis prima baccæ maturitate sæpius plus minus spiraliter contortis. *Ovula* in loculis geminata superimposita. *Stylus* basi minute constrictus v. articulatus, mox sejungens. *Stigma* obtusum, subcapitatum v. capitatum. *Bacca* exsucca 1–2 (rariss. 3) -sperma. (*Embryonis M. pubescentis cotyledones* foliaceæ, intortuplicatæ; *radicula* longiuscula conspicua.) *Arbores* v. *subarbores* inermes; foliis pinnatis; inflorescentia terminali cymosim corymbosa, multiflora.

1. M. PUBESCENS, *Bl. l. c.* Foliolis 9 15–21, calyce cupulato integro v. 5-lobulato, ovario 5 (in var. 4-3-2) -loculari plus minus piloso, stigmate stylo paulo latiore capitato.

Var. *α*. Foliolis 2½–3½ unc. longis 1–1½ unc. latis, calyce fere integro, stylo ovarium sæpius æquante v. paululo excedente.—*Cookia punctata,* Hassk. Cat. Hort. Bog. alt. p. 215; Miq. Fl. Ned. Ind. i. pt. 2, 524.—*Bergera villosa,* Wall. Cat. 6372.

Var. *β*. Foliis sæpe 12–20 unc. longis, foliolis 3½–6 unc. longis 1½–2 unc. latis, cymis corymbosis latioribus, floribus majoribus, calyce triangulari-lobulato.—*Bergera integerrima,* Roxb. Fl. Ind. ii. 376; DC. Prod. i. 537.—*B. villosa* (*forma pubescens*), Wall. Cat. 6372.

Var. *γ*. Foliolis angustioribus 1½–3½ unc. longis. ½–1½ latis, calyce lobulato, stylo sæpius ovarium excedente.

(Var. *δ*. (*glabrescens*). Foliolis pro ratione latioribus sæpius 1½–3½ unc. longis 1–2¼ latis, floribus parvis, calyce lobato-dentato, ovario 5–4–3–2-loculari.—*Micromelum glabrescens,* Benth. Lond. Journ. Bot. ii. 212.—*Limonia minuta,* Forst. Prod. n. 190.—*Glycosmis subvelutina,* F. Muell. Frag. Phyt. Aust. i. 25.)

Loc. α. Java! *Spanoghe, Lobb & Zollinger in Hb. Hook.*; Penang! *Wall. Cat.* 8517; Sunda Straits, *Staunton,* Hb. Mus. Brit.; forma *pubescens,* Philippines, *Cuming, Hb. Hook.*

β. Sikkim! 2–4000 ped., *J. D. H.*; Assam! Napalia infer.! *Wall. Cat.* 8518; (*pubescens*) In ripa Saluen fl.! *Hb. Wall.*

γ. Ins. Ceylon! *Walker,* 1600 ped.; *Gardner,* No. 108; *Thwaites* (*C. P.* 188).

(*δ*. Friendly Islands! *Barclay & Harvey*; Fiji! *Milne*; N. Caledonia, *Anders., Hb. Mus. Brit.*; Barnard ins.! *M'Gillivray*; Wide Bay, East-subtropical Australia! *Bidwill.*; Trop. Austr., *Cunningham*; Port Essington! *Hb. Hook.*; Cape Upstart! *M'Gillivray*; Albany and Cairncross Islands! *Mueller*; subvar. *velutina,* Burdekin River! *Mueller.*)

Arbor. v. *Arbuscula.* *Foliola* ovato-lanceolata, ovata, v. lanceolata, basi nunc subangustata nunc oblique fere cordata, leviter acuminata, apice obtusa, v. obtusiuscula, supra glabra v. glabrescentia, subter plus minus pubescentia, interdum utrinque pubescentia. *Pedicelli* sæpius circa 1 lin. longi v. breviores v. (in var. *β*.) nonnunquam longiores. *Calyx* cupulatus, 5-lobulatus v. subinteger. *Petala* anguste oblonga v. lanceolata, apice subacutata, utrinque plus minus pubescentia v. puberula. *Antheræ* rotundatæ, didymæ v. late elliptico-oblongæ. *Ovarium* pilosum v. subhirsutum, rarissime fere glabrum, normale 5 (variat. 4–3–6–7–2) -loculare. *Stylus* crassiusculus, ovario longior v. brevior, sursum glaber, denique abrupte sejungens. *Bacca* 1–2-sperma, glabra v. pubescens v. subvelutina.

2. M. HIRSUTUM, sp. nov. Foliolis 15–23 basi valde inæquilateralibus, calyce parvo 5-triangulari-lobato, petalis extus hirsutis, ovario 5-loculari, stigmate stylo subæquilato.

Loc. Penang! *Wall. Cat.* 8516.

Folia 10–16 unc.; foliolis trapezoideo-lanceolatis v. ovato-lanceolatis, sæpe non parum acuminatis apice obtusiusculis, margine leviter denticulatis, supra sparse pilosis v. glabrescentibus, subter præcipue secus costam venulasque pilosis v. hirsutis. *Inflorescentia* cymosim divaricata, corymbosa v. subpaniculata, hirsuta. *Pedicelli* brevissimi. *Petala* anguste v. lineari-oblonga. *Bacca* jun. ovali-oblonga, hispida, breve et anguste stipitata.

Chiefly differing from *M. pubescens* in the long leaves with very numerous leaflets, small calyx, and petals strongly hairy externally.

[M. MOLLE, *Turczaninow in Moscow. Bull.* (1858), p. 380. Foliolis 10–13 utrinque plus minus pubescentibus, petalis 6 v. 5 patentibus v. reflexis, ovario glabro v. fere glabro, sæpissime 4-loculari.

Loc. Philippine Islands! *Cuming,* 1056. *Hb. Hook.*]

[M. TEPHROCARPUM, *Turcz. l. c.* Foliolis 9–21 glabris glabrescentibusve basi valde obliquis, ovario glabro 5-loculari.

Loc. Philippine Islands! *Cuming,* No. 597. *Hb. Hook.*

I am not sure if these two species of *Turczaninow* be specifically distinct. Probably they are, but I have seen but few specimens. In *M. tephrocarpum* the young berries are remarkably clothed with closely interwoven microscopic filaments of an ashy, glaucous grey colour (whence the name). I think this is probably due to some fungoid growth. The young ovaries being glabrous.]

8. PARAMIGNYA, *R. Wight. Illust. Ind. Bot.* i. 108.

Calyx 5 (v. 4) -lobulatus v. lobatus. *Petala* 5 (4), libera, æstivatione sæpius imbricata. *Stamina* 10 (v. 8 v. 12.), libera, æqualia v. subæqualia; filamentis linearibus; antheris lineari-oblongis. *Ovarium* in toro elevato, conspicuo, æquicrasso impositum, 5- v. 4- v. 3-loculare; ovulis solitariis v. geminatis, oblique superimpositis. *Stylus* elongatus, primum ovario continuus, denique basin versus sejungens. *Stigma* stylo latius, plus minus capitatum. *Bacca* 1–5-sperma. (*Semina* cotyledonibus carnosis, æqualibus.) *Frutices* sæpe scandentes, spinis axillaribus armati v. inermes. *Folia* 1-foliolata. *Flores* plerisque magnitudine fere citri, axillares, solitarii v. 3–4–8-fasciculati.

1. P. MONOPHYLLA, *Wt. l. c.* et tab. 42. Floribus solitariis v. 2–4-fasciculatis pedicellis excedentibus v. subæqualibus, calyce cupulato late 5-rotundato- v. quadrato-lobulato, staminibus 10 (v. 12), ovario 3–4–5-loculari, ovulis geminatis oblique superimpositis.

Loc. Prov. Sikkim! 2–5000 ped., *J. D. H.*; Khasia! *Hb. Griffith*; Concan! *Law, Stocks*; Ceylon! *Walker, Gardner, Thwaites* (*C. P.* 1202).

Var. Foliolis late ellipticis v. obovato-ellipticis, brevissime apiculatis. Moulmein! 5000 ped., *Lobb, Hb. Hook.*

Frutex scandens (fide Wight, l. c.), sæpius spinis axillaribus, recurvis, armatus; spinis nunc 8–10 lin. longis, nunc fere obsoletis. *Folia* 1-foliolata; foliolo cum lamina vix distincte articulato, 5–10 (4–7) lin. longo; lamina elliptica, ovalis v. oblonga, sæpius breviter acuminata, interdum apice rotundato-obtusa, integra v. obsolete crenulata, glabra v. infra secus costam pubescentia, 2½–4 unc. longa.—*Pedicelli* 2–4 (-6) lin. longi. *Calyx* lobis integris v. marginatis retusisve. *Petala* oblonga, æstivatione valde imbricata. *Stamina* filamentis anguste linearibus, complanatis, glabris v. pilosis. *Ovarium* sæpe leviter sulcatum, pilosum v. fere glabrum; ovulis rarius solitariis, superiore lateraliter adfixo, inf. plus minus pendulo. *Stylus* sursum glaber. *Bacca* fide Wight, ovata sed ut mihi videtur pyriformis v. obovata, pubescens v. fere glabra. *Semina* compressa, testa membranacea. *Cotyledones* carnosæ, æquales.

2. P. GRANDIFLORA, *Wall. Cat.* Floribus sæpius solitariis pedunculis brevioribus v. æquilongis, calyce cupulato, rotundato-lobato, staminibus 10, ovario 5-loculari, ovulis (normale) solitariis v. interdum geminatis superimpositis.

Loc. Singapore! *Lobb. Hb. Helfer.* 925 & 83; Tavoy, *Wall. Cat.* 6361.

Ramuli breviter pilosi v. glabri, spinis axillaribus brevibus vix recurvis armati v. inermes. *Petiolus* supra medium articulatus, 3–6 lin. longus. *Foliolum* ovato-ellipticum v. oblongo-ellipticum, breviter acuminatum, apice obtusum, sparse pilosum v. glabrescens. *Pedunculi* 1–flori, pedicello articulati, 7–9 lin. longi. *Calyx* lobis integris vel emarginatis. *Petala* 5, oblanceolata, æstivatione valde imbricata. *Stamina* filamentis linearibus, apice abrupte et breve angustis, pilosis; antheris linearibus. *Ovarium* in toro fere æquilongo impositum, 5-loculare. *Stylus* infra pilosus. *Fruct.* non vidi.

3. P. CITRIFOLIA. Floribus 2–3-fasciculatis v. breve racemosis v. solitariis, pedicellis brevissimis calycem æquantibus vel paulo excedentibus, calyce 5-triangulari-lobato v. lobulato, ovario 5-loculari, ovulis geminatis superimpositis.—*Limonia citrifolia*, Roxb. Fl. Ind. ii. 379, et tab. Mus. (E.I.C.) 2243.—*Citrus scandens*, Griff. Notulæ iv. 495, ic. 587. 1.

Var. β. (*pubescens*). Foliolis oblongis subtus sparse pilosis, ovario piloso (*Limonia oblonga*, Wall. Cat. 6359 ?)*.

? Var. γ. (*Malaccensis*.). Pedicellis calycem excedentibus, æstivatione corollæ valvata.

Loc. Chittagong, *ex Roxb. l. c.*; Assam! *Hb. Hook.* Var. β. Mogoung, Birma! *Griffith.* Var. γ. Malacca! *Griffith.*

Frutex scandens spinis axillaribus brevibus recurvis armatus v. interdum spinis obsoletis. *Petiolus* lamina vix conspicue articulatus, 3–4 lin. longus. *Lamina* oblongo-elliptica, sæpius breviter et obtuse acuminata, integra v. leviter undulato-crenulata, 3½–5 unc. longa, 1½–2½ unc. lata. *Pedicelli* (in *a*) breves, 1–3 lin. longi. *Petala* æstivatione verisimiliter normali imbricata. *Stamina* 10. *Ovarium* glabrum v. pilosum. *Bacca* (fide Roxb. l. c.) ovata, 1–4 sperma.

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* The specimen of this in *Hb. Wallich* is very bad.

4. P. ARMATA. Floribus nunc 3–4–8-fasciculatis nunc solitariis, pedicellis gracilibus, calyce leviter obtuse 5–4-triangulari-lobulato v. dentato-lobato, staminibus 8 (–10), ovario 3 (v. 4) -loculari, ovulis sæpissime solitariis.—*Arthromischus armatus*, Thw. En. Pl. Zeyl. p. 47.

Loc. Ceylon! alt. 6000 ped., *G. Thoms. in Hb. Hook.*, *Gardner* (No. 110), *Thwaites* (*C. P.* 3115), *Macrae.*

Frutex (fide Thwaites, l. c.) scandens; spinis deflexis v. recurvis. *Petiolus* 2–5 lin. *Foliolum* ovato-oblongum v. lanceolatum, acuminatum, apice obtusum v. mucronulatum, glabrum v. secus costam minute puberulum, 1½–3 unc. longum, 8 lin.-1½ unc. lat.. *Pedicelli* 2½–4 lin. longi. *Calyx* parvus. *Petala* æstivatione valde imbricata. *Stamina* filamentis lineari-subulatis, pilosis; antheris lineari-oblongis. *Ovarium* pilosum. *Fructus* (fide Thw. l. c.) "rotundatus, flavescens, 4–8 lin. in diametro"–"1–4-spermus."

9. LUVUNGA, *Hamilton in Wall. Cat.* 6382.

Calyx cupulatus margine, 4–5 (6)-lobulatus v. fere integer. *Petala* 4 v. 5, libera, lineari-oblonga v. lanceolata, æstivatione imbricata. *Stamina* 8 v. 10, libera, æqualia v. subæqualia; filamentis lineari-subulatis v. infra plus minus in tubum v. irregulariter coalitis v. liberis; antheris linearibus v. lineari-oblongis. *Ovarium* in disco brevi elevato annulato-cupulato impositum, 3–4 (v. 2)-loculare; ovulis in loculis geminatis, oblique superimpositis. *Stylus* continuus, crassiusculus. *Stigma* capitatum. *Bacca* cortice crassa, 3-2–1-sperma. *Embryonis* cotyledones æquales, carnosæ, oblongæ. *Frutices* scandentes, glabri, sæpe spinis axillaribus armati. *Folia* trifoliolata. *Flores* in racemis v. fasciculis v. paniculis parvis cymosis, axillaribus.

1. L. SCANDENS, *Hb. Ham. ex Wall. Cat.* 6382. Foliolis lanceolatis v. oblongo-lanceolatis, calyce 4 (v. 5) ad marginem late rotundato- v. truncato-lobulato, filamentis in tubum plus minus coalitis, ovario 4- 3-loculari.—*Limonia scandens*, Roxb. Fl. Ind. ii. 380. et tabb. (Mus. E. I. C.) 1153, 2056.

Loc. Silhet! *Hb. Wall.* 6282, B.—Birma! *Griffith.*

Frutex glaber, spinis leviter recurvis armatus v. inermis. *Petiolus* 1–4 unc.; petioluli 1½–3 lin. longi. *Foliola* glabra, coriacea, sæpius plus minus acuminata, 3–10 unc. longa, 1½–2½ unc. lata. *Flores* in paniculis v. racemis cymosis, breve pedicellati, ped. 1–3 lin. longi. *Bacca* ovalis v. oblonga, primum apiculata (fide Roxb. l. c.), magnitudine ovi columbæ instar, quasi 3-lobulata, 1–3-sperma.

Specimens in the Hookerian Herbarium from Assam (*Jenkins*) and Malacca (*Griffith*) may belong to this or the following species.

2. L. ELEUTHERANDRA, *Dalzell, in Kew Misc.* ii. 258. Foliolis ellipticis v. obovatis, calycis lobulis truncatis, filamentis liberis, ovario 3 (v. 4) -loculari.—? *Triphasia sarmentosa*, Bl. Bijd. i. 132.

Var. *β* (*angustifolia*). Foliolis *L. scandentis*.

Loc. Bombay! *Dalzell*; (Concan!) *Stocks.* Var. *β*. Ceylon, *Walker, Thwaites* (*C. P.* 1195).

Frutex scandens, sæpe spinosus, spinis recurvis. *Petiolus* 1–4 unc., petioluli 1–3 lin. long. *Foliola* sæpius breviter apiculata, glabra, 3–6 unc. longa, 1–2 lata.

Mr. Thwaites states this species to have a tendency to become diœcious.

Luvunga Tavoyana, Ldl. in Wall. Cat. 6383, I cannot consider to be specifically distinct from this plant. It forms, indeed, a connecting link which may warrant the union of the Indian forms under one species. It is apparently a larger plant with oblong-elliptical leaflets, 4–8 ins. long, very shortly and obtusely apiculate, with a petiole of from 3–6 ins. The flowers in short fascicles, or panicles, ½ to 2 ins. long; the stamens free, or slightly united at the base, and the ovary 3- or 2-celled. It occurs both unarmed and with strong, recurved, axillary spines.

[*L. Motleyi*, sp. nov. Foliolis grandibus obovato-lanceolatis v. ovalibus, calyce margine leviter 5- triangulari-lobulato v. fere integro, staminibus 10 liberis, ovario 3- v. 4-loculari.

Loc. Banjarmassing, Borneo merid! *Motley in Hb. Hook.*

Rami (ex Sched. Motl.) viminei, glabri. *Petiolus* crassitie sæpe pennæ corvinæ, 10–12 unc. longus. *Petioluli* interdum 8–10 lin. longi. *Foliola* integra v. obsolete undulato-crenata, 9–18 unc. longa, 4–6 unc. lata. *Flores* in cymis densis, depressis, axillaribus, breve pedicellati.

Differs chiefly from *L. eleutherandra* in the large size of the leaves; the calyx and corolla seem pentamerous. In the two preceding species they are probably normally tetramerous.]

There is another *Luvunga* sent to Sir W. J. Hooker by the late Mr. Motley from S. Borneo, which may be distinct. The corollas are fallen. The calyx appears unusually small and scarcely cupulate. The ovary 2- or 3-locular, with geminate, superimposed ovules.

10. FERONIA, *Correa in Linn. Trans.* v. 224; *DC. Prod.* i. 538.

1. *F. Elephantum*, Corr. l. c. 223; DC. l. c. 538.

In Peninsula et in Himalaya Tropica. Ins. Java! *Horsfield, Zollinger & Blume.*

F. pellucida, Roth. Nov. Pl. Sp. 384, is unknown to me.

11. ÆGLE. *Correa, l. c.* p. 222; *DC. Prod.* i. 538.

1. Æ. MARMELOS, *Corr. l. c.* p. 223; *DC. l. c.*—? *Æ. sepiaria*, Bl. Bijd. i. 140.

In Peninsula et in Himalaya tropica! Ins. Java! *Horsfield.*

Notes on *Menispermaceæ*. By GEORGE BENTHAM, V.P.L.S.

[Read March 7th, 1861.]

IN the *Menispermaceæ*, as in the *Anonaceæ*, Hooker and Thomson have left but little to be done with regard to the Asiatic genera, until we shall have more satisfactory materials. The constant unisexuality of these plants, the difficulty of matching the male and female specimens even when we possess both, the great differences occasionally observed in the ripe fruit and seeds of species which are almost identical in their male flowers, are great obstacles to the proper classification of the order from herbarium specimens. It is indeed often impossible to identify species or genera which have been established on the examination of one sex only. And this is peculiarly the case with the South American *Menispermaceæ*, which have been so much mismatched, even by the experienced hand of Miers, that we have been obliged to reject amongst doubtful and indeterminable genera most of those of which one sex only, or the fruit without the flowers, have been described.

Before entering into any generic details I would advert, in a few words, to the so-called opposition of the stamens to the petals in *Menispermaceæ* and *Berberideæ*, as compared to that observed in *Buettneriaceæ*, *Rhamneæ*, *Ampelideæ*, *Myrsineæ*, *Primulaceæ*, etc., which is only apparent in the former case, more real in the latter. In the trimerous, dimerous, or rarely tetramerous *Menispermaceæ* and *Berberideæ*, the petals and stamens each usually consist of two distinct whorls—the outer stamens opposite to the outer petals, the inner stamens opposite to the inner petals—and consequently those of each whorl alternate with those of the whorl immediately below them, precisely as in the great mass of flowering plants. In the *Primulaceæ*, *Rhamneæ*, and other usually 5-merous or 4-merous families above mentioned, the opposition of the stamens to the petals seems to be more real, both being in single whorls, and suggesting in some cases (e. g. *Primulaceæ*) the suppression of an intermediate whorl, or perhaps in others (e. g. *Rhamneæ*), giving the idea of a common origin, as it were, of the petal and its opposite stamen; the latter being perhaps developed in the axil of the former, rather than produced from it by a so-called *dédoublement*, as supposed by A. Gray.

Before Miers published his outline sketch of the genera of *Menispermaceæ*, the South American species of the order had been by most authors referred either to *Cissampelos* or to *Cocculus*. The former genus is so easily recognized in its male flowers, as well as in the female flowers or fruit, that it remains almost undisturbed within its own limits, although much reduced as to species; for Hooker and Thomson have shown that one tropical plant, common to the three great continents, has so wide a range and appears so variable in the fragmentary state we often find it in our collections, that it represents nearly half the published species of the genus. With regard to the *Cocculi*, Miers has pointed out differences in the structure of the seed, which, although not always accompanied by tangible differences in the male flowers, appear to be too important to be neglected in the circumscription of genera; and it is probable that, when better known, the group so characterized may be recognized by habit or other peculiarities. The same author had, however, unfortunately referred a ripe fruiting specimen of *Cocculus domingensis*, DC., to flowering specimens of *Abuta*, instead of to those of *Hyperbœna*; and Grisebach, in attempting to clear up this confusion, whilst he well distinguished *Abuta* in a note published in v. iii. p. 108 of this Journal, has, in his 'West Indian Flora,' overlooked the fact that the fruit of both the species he retains in *Cocculus* had been sufficiently described by Miers or by Poeppig, to be removed from that genus as characterized by him. Again, a female specimen in Seemann's collection referred (Bot. Her. p. 76) to a male *Abuta* (although with hesitation on Miers' part) as the *Batschia racemosa* of Thunberg, proves to belong to a very different natural order, and Triana, from some memoranda in the Hookerian Herbarium, does not admit that even Seemann's male specimen is that of Thunberg's *Batschia*, which he recognizes in a different-looking female specimen of his own, deposited in the same herbarium. To me, however, it appears that Seemann's male and Triana's female belong to one species of *Abuta*, and that, as far as we can judge from descriptions, *Batschia racemosa*, Thunb. is the same.

The American tropical cocculoid Menispermaceæ, sufficiently known to be generically determined, may be classed as follows:—

1. Chondodendron, *Ruiz et Pav.* Habit, inflorescence, straight fruit and albuminous seed of *Tinospora*, but with monadelphous stamens.

2. Anomospermum, *Miers.* Petals succulent, forming a flat triangular, areolated disk, each compartment enclosing its stamen. Fruit and seed straight. Albumen very much ruminate.

3. Abuta, *Aubl.* Petalless flowers, horseshoe seeds with a very

much ruminated albumen, as characterized by Grisebach in the abovementioned note.

4. Cocculus, *Linn.*, as now limited, with small petals, free stamens, horseshoe seeds, and entire albumen.

5. Hyperbæna, *Miers*, with *Cocculus* flowers and horseshoe seeds, but a thick, fleshy embryo without albumen.

6. Botryopsis, *Miers*, with the fruit and seed of *Hyperbæna*, but a very different habit, an increase in the number of sepals, and long inflected points to the anthers.

7. Sciadotænia, *Miers*, with the seeds of *Hyperbæna*, but the carpels raised on long pedicels as in *Tiliacora*; the male flowers as yet unknown.

Chondodendron, *Ruiz et Pav.*

Although the seeds in this American genus have only been seen by Poeppig, and although his description is very imperfect and his figure rude, there seems no reason to doubt that they are similar to those of the Asiatic *Tinospora*, from which there is little to distinguish it besides the monadelphous stamens. Miers mentions 8 species, but, judging from our specimens, I can find no character to separate the *C. convolvulaceum*, Poepp., *C. hederæfolium*, Miers, and *C. scabrum*, Miers, from the original *C. tomentosum*, R. et P. The form of the leaves will vary on the same specimen from quite entire and cordate with a deep narrow sinus, to broadly and openly cordate and more or less hastately 3-lobed. They are always more or less pubescent underneath, sometimes densely and softly so, and rough on the upper side with a very minute pubescence. The species is widely spread in Brazil, Guiana, and the eastern side of the Peruvian Andes. It is also Spruce's n. 3567, from the banks of the Guainia or Upper Rio Negro in Venezuela, where it establishes itself in places once cultivated. The *C. tamoides*, Miers (*Cocculus tamoides*, DC. Syst. Veg. v. i. p. 521), has the same diversity in the form of the leaves; but they appear to be perfectly glabrous. I have only seen it from Cayenne and British Guiana.

Anomospermum, *Miers.*

Miers proposes three species of this genus which is very peculiar in habit and character; but on comparing a considerable number of specimens, I am unable to separate them into distinct varieties. The *A. Hostmanni*, Miers, has indeed rather smaller and more coriaceous leaves with less prominent veins than the original specimens of his *A. Schomburgkii*; but others again, both of Schomburgk's later collections and of Spruce's, connect them too gradually to keep them any longer distinct. I have not seen the *A. nitidum*, Miers, from the Organ Mountains, but Sello's specimens from the same province of Rio Janeiro are in no manner to be distinguished from *A. Schomburgkii*, except in the somewhat larger size of the leaves. The following is a short description of the species:—

A. SCHOMBURGKII, *Miers* (*A. Hostmanni*, Miers, an etiam *A. nitidum* Miers?). Scandens, glabrum v. ramulis inflorescentiisque minute puberulis. Folia petiolata, oblonga, obtuse acuminata, 2–4-pollicaria, rigide coriacea, nitida, basi tenuiter 3-nervia, pennivenia et reticulato-venulosa, venis tamen omnibus tenuibus et interdum parum conspicuis. Pedunculi solitarii v. superposite 2–3-ni, 1–3-flori, 3–6 lin. longi, nunc suprà-axillares, nunc in racemos axillares laxos, plus minus elongatos dispositi. Alabastra globosa, circa 2 lin. diametro; flores aperti circa 4 lin., albidi v. pallide flavicantes. Sepala 6; 3 exteriora parva, cordata, 3 interiora multo majora, orbiculata. Petala 6, sepalis multo breviora, crasso-carnosa, stamina singulatim involventia, in discum planum triangularem, 6–areolatum conferta. Fl. ♂, stamina 6 petalis longiora, antherarum loculis versus apicem divergentibus. Fl. ♀, stamina 6, sterilia. Carpella 3. Stigmata ovata, patentia. Drupæ ovoideo-oblongæ, styli cicatrice terminatæ. Putamen rectum, endocarpio ad ventrem in laminam verticalem membranaceam introrso. Semen oblongum, ad faciem interiorem sulcatum, laminam endocarpii fovens. Albumen laminis horizontalibus ruminatum. Embryo tereti-compressus, albuminis fere longitudine, rectus. Radicula supera. cotyledonibus appressis.

Hab. British Guiana (near Pirara), *Rob. Schomburgk*, 1st coll. n. 833, 2nd coll. n. 891; *Rich. Schomburgk*, n. 1499; Surinam, *Hostmann*, n. 1298; on the Rio Uaupès in N. Brazil, *R. Spruce*, n. 2563; in the province of Rio Janeiro, *Sello*.

ABUTA, *Aubl.*

I have already alluded to the confusion which has arisen in this genus from the mismatching male and female specimens, and which still prevails as to the limitation of the species. Grisebach mentions two as occupying each a wide geographical area. Our herbaria appear to comprise four or five, and it is probable that there are some others amongst the Brazilian *Cocculi* shortly described in Martius's 'Herbarium Floræ Brasiliensis.' The following are those which belong to numbered or named collections in the Kew Herbaria*.

1. *A. concolor*, Poepp., as limited by Grisebach (the inflorescences as well as the rest of the plant are always perfectly glabrous). *Anelasma Guianensis*, Miers,—British Guiana, *Rob. Schomburgk*, 2nd coll. n. 440, *Rich. Schomburgk*, n. 696; Cayenne, *Martin*.—*Anelasma laurifolia*, Sagot, pl. exs. n. 20, from Cayenne.—*Anelasma Spruceana*, Miers, in Kew Journ. Bot. v. iii. p. 116, North Brazil, *Spruce*—viz. opposite the Isle of Marimahituba on the Amazon, n. 402, near Barra do Rio Negro, n. 1415; in the forest and capoeiras near Barra, n. 1829; at the falls of San Gabriel on the Rio Negro, n. 2192, on rocks near the cataract of Panurè on the Rio Uaupès, n. 2763 (described sometimes as a climber, sometimes as a shrub with weak but not climbing branches).—*Anelasma Gardneriana*, Miers, in dry woods near Nativitade, province of Goyaz in Brazil, *Gardner*, n. 3567 (described as a small tree).

2. A closely allied species, or perhaps a variety of *A. concolor*—*Batschia conferta*, Thunb., according to Miers in Seem. Bot. Her. p. 76, from the Bay of Ardita, Isthmus of Panama (small specimens, the supposed females with opposite leaves belong to a *Strychnos*).—*Batschia racemosa*, Thunb., according to Triana, from Mariquita in New Grenada (female specimens).

3. A large stout species with very coriaceous leaves, glabrous as in *A. concolor*, but broader and the inflorescence hoary; North Brazil, *Spruce*; in the forest near Barra, n. 1416, and in the gapò of an *igarapè* or creek of the Rio Negro near San Gabriel, n. 2393.

4. A glabrous species like *A. concolor*, but with much narrower and smaller leaves—*Anelasma Sellowiana*, Miers—Brazil, *Sello*.

5. *A. rufescens*, Aubl., according to Grisebach; Cayenne, *Sagot*; North Brazil, *Spruce*; in the forest near Barra, n. 1251, and in the capoeiras near San Gabriel, n. 2346.

COCCULUS, DC.

Cocculus proper, as limited by Hooker and Thomson, contains, besides the five Indian species enumerated in their flora, two American species, *C. carolinianus*, DC., from the Southern United States, and *C. oblongifolius*, DC., apparently a common Mexican plant (Berlandier, n. 2300, Coulter, n. 657 and 1656, Galeotti, n.

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* In Grisebach's note on Abuta above alluded to, several clerical or typographical errors occur in the Sprucean numbers quoted, and they are therefore here repeated.

1536), and two Chinese ones, *C. ovalifolius*, DC., Benth. Fl. Hongk. p. 13, from south China, and the following unpublished species.

C. CUNEATUS, sp. n. Foliis cuneato-oblongis apice retusis emarginatis v. obcordatis coriaceis nitidis venosis, cymis racemisve paucifloris folio brevioribus.—Rami tenues, pubescentes; folia breviter petiolata, 1–2 poll. longa, prope apicem ½–1 poll. lata, usque ad basin longe angustata, basi trinervia, cæterum reticulato-pennivenia. Pedunculi plerique tenues, pubescentes, 3–6 lin. longi, cymulam parvam ferentes, nonnulli in racemos elongantur 1–1½-pollicares, cymulas plures ferentes brevissime pedicellatas. Sepala 6, biseriata, valde imbricata, a bracteis exterioribus minimis 1–2, in sepala interiora late orbiculata, gradatim aucta. Petala 6, sepalis breviora, staminibus longiora, basi auriculata filamenta amplectentia, apice bifida. Stamina 6, libera; antheris 4-locularibus. Flores fœminei adhuc ignoti.

Hab. China, on the west coast of the island of Formosa, *Wilford.*

HYPERBÆNA, *Miers.*

Of this genus our herbaria contain the three following species, which appear to me to be distinct, although with so much general resemblance to each other that Grisebach unites them all under *Cocculus domingensis.*

1. H. DOMINGENSIS. Ramulis glabris, foliis ovalibus v. ovali-oblongis glabris tenuiter coriaceis minute crebreque reticulatis a basi 3–5-nervis (nervis lateralibus rarius cum costæ basi concretis), drupis obovato-rotundatis.—*Cocculus domingensis,* DC.; Griseb. Fl. Brit. W. Ind. p. 10.—*Anelasma jamaicensis,* Miers.

Hab. Jamaica, Dominica, Cuba (*Wright,* n. 23).

2. H. RETICULATA. Ramulis glabris puberulisve, foliis, oblongis v. elliptico-lanceolatis rigide coriaceis reticulato-penninerviis (nervis lateralibus baseos sæpe evanidis), drupis obovato-rotundatis.—*Cocculus reticulatus,* Mart. Herb. Fl. Bras. p. 284.

a. Racemis masculis gracilibus elongatis glabris v. puberulis.—*Hyperbœna mexicana,* et *H. Moricandi,* Miers.

Hab. Mexico, *Jurgensen,* n. 91; Jamaica, *Purdie*; on the Casiquiare in Venezuela, *R. Spruce,* n. 3167; at Ilheos in the province of Bahia, Brazil, *Blanchet,* n. 2346.

β. Racemis confertioribus pubescentibus villosisve.—*H. Hostmanni,* Miers.—*Anelasma? minutiflora,* Sagot, Fl. Gui. exs.

Hab. Surinam, *Hostmann,* n. 1050; Cayenne, *Sagot,* n. 833.

3. H. TWEEDII, *Miers.* Ramulis petiolisque fusco-ferrugineo-tomentosis, foliis ovali-oblongis obtusis tenuiter coriaceis reticulato-penniveniis obscure triplinerviis glabratis, floribus fœmineis cymosis glabris.

Hab. South Brazil, in woods near Portoalegre and on the Rio Grande do Sul, *Tweedie.*

BOTRYOPSIS, *Miers.*

The *Cocculus platyphylla*, A. de St. Hil., upon which this genus is founded, is certainly very distinct from other *Cocculi*, both in calyx and fruit. It appears to be widely spread in southern Brazil and is Spruce's n. 4474 from Tarapoto. The *Abuta? tomentosa* of Sagot's Cayenne plants, n. 19, is probably a second species; for it has the same multiplication of sepals, but the female flowers and fruit are as yet unknown.

SCIADOTÆNIA, *Miers.*

A genus founded on a specimen of Martin's from Cayenne, with long axillary peduncles, bearing each what at first sight appears to be a fruiting umbel, and is so described by Miers; but a more careful examination shows that each ray bears only a single carpel, that the scars of the perianth are round the base, not at the summit of the rays, and that these rays are not pedicels, but podocarps, more or less united at the base (in Martin's specimen), precisely as in *Tiliacora*, the supposed umbel of fruits being the result of a single flower. The unusual number of carpels, the peculiar inflorescence, and fleshy embryo without albumen, are, however, sufficient to characterize it as a distinct genus, independently of the flowers, which were entirely unknown. Since, however, these observations have been drawn up, I have received, in a most valuable set of Cayenne plants collected by Dr. Sagot, a specimen of the same species under the name of *Abuta? umbellata*, also in fruit, but with notes on, and a sketch of, the female flower, which entirely confirms the above views. The perianth is in 3 series of 3 each, of which the inner series is twice as large as the other, as in *Coscinium*. This proportion is quite exceptional in *Menispermaceæ*, if this perianth be considered as consisting of 3 sepals and 6 petals; for in all other genera the petals where present are shorter than the sepals. Perhaps it would be more in conformity with the general plan of the order to consider both *Coscinium* and *Sciadotænia* as apetalous; the perianth consisting, as in some *Abutæ*, of 3 rows of sepals, or of 2 rows of sepals with 2 or 3 external bracts. In Sagot's specimen the podocarps are more spreading than in Martin's, and scarcely united at the base; but it appears to belong to the same species, which may be thus described:—

SCIADOTÆNIA CAYENNENSIS. Scandens. Ramuli, petioli, et interdum venæ primariæ foliórum tomentoso-pubescentes vel demum glabrati.

Folia cæterum glabra, ovalia v. obovali-oblonga, acuminata, 4–5-pollicaria, basi cuneata et 3-nervia, nitidula, petiolo pollicari. Pedunculi fœminei axillares, 4–8-pollicares, flore unico terminali parvo. Perianthii segmenta (sepala?) 9, 3-seriata, seriei interioris duplo majora. Carpella 6–10, per anthesin fere sessilia, sericeo-pilosa, stylo setaceo terminata; matura reniformi-globosa, supra podocarpia elongata articulata, glabrescentia, podocarpiis 6–9 lin. longis, nunc erectis et basi coalitis, nunc magis patentibus et subliberis.

Hab. Cayenne, *Martin*; near Korouany, *Sagot*, n. 23.

In Australia only four *Menispermaceæ* are as yet known, two of them, *Pericampylus incanus*, Miers (*Cocculus Moorei*, F. Muell. Fragm. Phyt. Austr. i. 162), and *Stephania hernandiæfolia*, Walp. (*S. australis* and *S. Gaudichaudi*, A. Gray, Bot. Amer. Expl. Exped. v. i. pp. 37, 38; *Cocculus Hookerianus*, F. Muell. MSS.), are widely-spread Asiatic species. The other two are peculiar to Australia, viz. *Sarcopetalum Harveyanum*, F. Muell. Fl. Vict. p. 27, suppl. t. 3, and the following new *Tinospora*:—

TINOSPORA SMILACINA (*Cocculus smilacinus*, F. Muell. MS.), Scandens, glabra, ramulis subcarnosis. Folia ovata, basi profunda et late cordata, auriculis rotundatis, apice obtusa v. vix acuminata, 3–4 poll. longa, 5-nervia; venulis minoribus vix prominulis, petiolo subpollicari. Racemi fœminei simplices, pollicares; floribus parvis viridulis, pedicellis 1 lin. longis. Sepala 3 exteriora minima, triangularia, 3 interiora ovata, 1 lin. longa, patentia, tenuia. Petala dimidio breviora, obovata. Drupa oblonga, circa 3 lin. longa; flores masculi ignoti.

Hab. Plains of Promise in Eastern Australia, *D. Moore*. Nearly allied to the Asiatic *T. crispa*, but the leaves are rather differently shaped and the fruits much smaller.

Notes on *Tiliaceæ*. By GEORGE BENTHAM, V.P.L.S.

[Read March 7, 1861.]

THE *Tiliaceæ* are universally admitted, as a natural order, connected with *Malvaceæ* and *Sterculiaceæ* by their valvate calyx, but differing in their indefinite free, or nearly free, stamens, and distinguished from *Bixaceæ* by their several-celled ovary with axile placentation. None of these characters are absolutely constant, but the exceptional cases are readily classed by a combination of accessory characters pointing out their affinity; and I have no alteration to suggest in the general position and limitation of the order. It has been usual to divide it into two suborders, *Tilieæ* and *Elæocarpeæ*; the latter considered by some as a distinct order, founded on the notched or divided petals and the dehiscence of the anthers; whilst *Tilieæ* have been subdivided into two tribes, the *Sloanideæ* without petals, and the *Grewideæ* with petals. To me it appears, however, that *Sloanea* is much nearer allied to *Elæocarpus* than to *Grewia*; and it is probably under the same idea that Grisebach proposes to take the anthers as the primary character for the division of the order. But here, again, *Apeiba* and *Sloanea*, which are so different in other respects, are brought next to each other, and removed from other genera with which they appear to be generally much closer connected. If, however, we take the nature of the petals in the first instance, and secondly that of the stamens and calyx, and, following out the principle that governs the demarcation of the order, if we take neither of these characters as absolute, and admit of more or less exceptional genera, we have an apparently more natural distribution of the thirty-seven genera which we propose to adopt, into six tribes, grouped into two suborders.

The difference between these two suborders, to which we may give the names of *Holopetalæ* and *Heteropetalæ*, would then be in some measure analogous to that which we have established between *Bixaceæ* and *Samydaceæ*, but much less marked. In the *Holopetalæ* the petals are always present (except in one or two of the numerous species of *Grewia*); and, although sometimes small, they are of a true petaloid nature, entire or very slightly notched, glabrous, narrowed at the base, and deciduous. The stamens are decidedly hypogynous in all but *Muntingia*, inserted either on a small torus immediately within the petals, or on a raised torus, round the base of which are placed the petals. In the *Heteropetalæ* the petals, when present, are of a more or less calycine nature, often notched, fringed, or divided, hoary or pubescent outside, attached by a broad base and usually persistent, so as to have been sometimes described as inner calycine segments; and in some genera they are entirely absent, or present only in a very few species. The disk (usually covered with stamens quite to the ovary) is usually thick—in some genera so broad and flat as to appear perigynous, in others raised, bearing the stamens on the top, and surrounded by the petals at the base, very rarely small and hemispherical.

These two suborders would again be subdivided into six tribes, more or less natural, of which the *Holopetalæ* would comprise four.—1. *Brownlowieæ*, marked by a gamosepalous calyx, and approaching near to some *Sterculiaceæ*; 2. *Grewieæ*, with free sepals, short anthers opening longitudinally, and the petals foveolate at the base, and inserted round the base of a raised torus, bearing the stamens on the top; 3. *Tilieæ*, with the sepals and anthers of *Grewieæ*, or the anthers rarely elongated, but still versatile, and the petals never foveolate at the base and inserted close round the stamens, which cover the small or flattened, but never raised torus; 4. *Apeibeæ* with free sepals, but remarkable for their erect linear anthers with the connective more or less prolonged into a membrane beyond the cells; their dehiscence is, however, by longitudinal slits, as in other *Holopetalæ*. In the *Heteropetalæ* we have two tribes: 5, *Prockieæ*, comprising three somewhat anomalous genera, with small globular or ovoid anthers opening longitudinally; and 6, *Elæocarpeæ*, with erect anthers usually linear, often prolonged into a point, and opening from the apex downwards in confluent pores or short slits, giving them often a 2-valved appearance. These *Elæocarpeæ* are again divisible into two subtribes—*Sloaneæ*, with a broad, flat or convex disk entirely covered with stamens; and *Euelæocarpeæ*, with the stamens on the top of a raised disk, round the base of which the petals are inserted as in *Grewieæ*.

The following synopsis will more clearly show the proposed distribution of the Tiliaceous genera:—

Subordo I. HOLOPETALÆ. *Petala* glabra, colorata, tenuia, basi contracta v. unguiculata, integra v. rarissime emarginata, decidua.

Tribus 1. BROWNLOWIEÆ. *Sepala* in calycem campanulatum, 3–5-fidum coalita. *Antheræ* subglobosæ v. didymæ, loculis demum confluentibus.

* *Stamina 5 interiora ananthera (staminodia).*

Genera:—1. Pentace, *Hassk.*; 2. Brownlowia, *Roxb.*; 3. Diplodiscus, *Turczan*; 4. Pityranthe, *Thw.*

** *Stamina omnia antherifera.*

Genera:—5. Christiania, *DC.*; 6. Berrya, *Roxb.* (*Hexagonotheca*, Turczan.).

Tribus 2. GREWIEÆ. *Sepala* distincta. *Petala* basi foveolata, circa basin tori elevati apice staminiferi inserta. *Antheræ* breves, loculis parallelis, distinctis.

* *Fructus inermis, glaber v. tomentosus.*

Genera:—7. Grewia, *Linn.* (*Microcos*, Linn.; *Vincentia*, Boj.; *Omphacarpus*, Korth.); 8. Columbia, *Pers.*; 9. Diplophractum, *Desf.*; 10. Belotia, *A. Rich.* (*Adenodiscus*, Turczan.).

** *Fructus echinatus v. setosus.*

Genera:—11. Erinocarpus, *Dalz.*; 12. Triumfetta, *Linn.*; 13. Heliocarpus, *Linn.*

Tribus 3. TILIEÆ. *Sepala* distincta. *Petala* haud foveolata, circa stamina immediate inserta. *Antheræ* breves v. rarius elongatæ (et tum versatiles v. sagittatæ inappendiculatæ); loculis parallelis, distinctis.

* *Capsula loculicide dehiscens, echinata v. siliquæformis.*

Genera:—14. Entelea, *Br.*; 15. Sparmannia, *Thunb.*; 16. Clappertonia, *Meissn.* (*Honkenya*, Willd.); 17. Corchorus, *Linn.* (*Antichorus*, L. f.); 18. Corchoropsis, *Sieb. et Zucc.*

** *Capsula nuda, apice dehiscens.*

Genera:—19. Luhea, *Willd.* (*Alegria*, Moç. et Sess.); 20. Mollia, *Mart. et Zucc.*; 21. Trichospermum, *Blum.* (*Diclidocarpus*, A. Gray).

*** *Fructus indehiscens.*

Genera:—22. Muntingia, *Linn.*; 23. Tilia, *Linn.*; 24?. Leptonychia, *Turczan.*; 25. Schoutenia, *Korth.* (*Actinophora*, Wall.).

Tribus 4. APEIBEÆ. *Sepala* distincta. *Petala* haud foveolata, circa stamina immediate inserta. *Antheræ* lineares, erectæ, ultra loculos membrana terminatæ. (*Ovarium* multiloculare. *Fructus* indehiscens v. ab axi deliquescens.)

Genera:—26. Glyphæa, *Hook. fil.*; 27. Apeiba, *Aubl.*

Subordo II. HETEROPETALÆ. *Petala* v. nulla, v. sepaloidea v. incisa, extus sæpissime pubescentia v. canescentia, et basi lata inserta, sæpe persistentia.

Tribus 5.—PROCKIEÆ. *Antheræ* subglobosæ v. didymæ.

Genera:—28. Prockia, *Linn.* (*Trilix*, Linn. fil.; *Kellettia* Seem.); 29. Hasseltia, *H.B. et K.*; 30. Plagiopteron, *Griff.*,

Tribus 6. ELÆOCARPEÆ. *Antheræ* lineares, apice dehiscentes.

Subtribus 1. SLOANEÆ. *Discus* staminifer planus. *Sepala* et *petala* circa stamina immediate inserta.

Genera:—31. Sloanea, *Linn.* (*Ablania*, Aubl.; *Dasynema*, Schott; *Dasycarpus*, Œrst.); 32. Echinocarpus, *Blume*; 33. Ropalocarpus Boj.; 34. Vallea, *Linn. fil.*

Subtribus 2. EUELÆOCARPEÆ. *Petala* circa basin tori elevati glandulosi apice staminiferi inserta.

Genera:—35. Tricuspidaria, *R. et. P.* (*Crinodendron*, Molin.); 36. Aristotelia, *Lher.* (*Friesia*, DC.); 37. Elæocarpus, *Linn.* (*Ganitrus*, Gærtn.; *Aceratium*, DC.; *Beuthea*, Endl.; *Monocera*, Jack.; *Diceros*, Forsk.).

Without pretending to have examined all the species of all these genera of which we have specimens, there are some, however, upon which I have a few remarks to give.

BROWNLOWIA, *Roxb.*

The stellate pubescence, so common in *Tiliaceæ*, becomes sometimes in this genus scaly, and especially in the *B. lanceolata*, where the inflorescence is occasionally much reduced, and gives it almost the habit of some *Bombaceæ*, such as *Boschia*, Korth. (*Heteropyxis*, Griff.), to which, indeed, it comes nearer in other characters. The free stamens with single anthers, however, determine its place among *Tiliaceæ*. The genus is remarkable also for the seeds, which, as indicated by Roxburgh for the *B. elata*, and verified by myself in that species and in the *B. lanceolata*, have no albumen, the seed being entirely filled with the large embryo with thick fleshy cotyledons; whilst in all other *Tiliaceæ* where it is known, even in the otherwise closely allied genus *Pentace*, the albumen is copious and the cotyledons leafy.

Besides the original *B. elata*, Roxb., we have the two following new species of this genus:—

B. PELTATA. Foliis peltato-suborbiculatis demum glabratis; panicula ampla, terminali rufescenti-tomentella. Arbor parva. Rami floridi, crassi. Folium perfectum unicum vidi, excentrice peltatum, 8 poll. longum, 7 poll. latum, octonerve. Panicula divaricata *B. elatæ*, nisi amplior. Flores paulo minores, subsessiles, pallide rosei. Petala obliqua, undulata, basi in unguem brevem abrupte contracta. Filamenta interiora sterilia (seu staminodia), anguste linearia.

Hab. Banjarmassing, in Borneo, *Motley*, n. 1288.

The fruit is said to be eaten in curries. I have seen only a single specimen.

B. LANCEOLATA. Foliis lanceolatis suboblongisve coriaceis subtus lepidoto-incanis, paniculis axillaribus terminalibusque paucifloris folio brevioribus.—Arbor? Ramuli canescentes. Folia 4–6 poll. longa, 1–2 poll. lata, acuminata, basi obtusa, petiolo 2–3 lin. longo; novella utrinque canescentia, adulta supra glabra et nitida, subtus squamis minutis lepidotis omnino obtecta, penninervia et basi obscure 3-nervia. Paniculæ in axillis superioribus 1–2-pollicares et nonnunquam terminalis major, ramis tamen vix divaricatis. Calyces 2 lin. longi, uti pedicelli lepidoti. Petala paulo longiora, oblonga, basi parum contracta. Antherarum loculi ut in speciebus generibusque affinibus oppositi, divaricati, demum confluentes. Ovarium 4-lobum (3–5-lobum?). Carpella matura distincta, subglobosa, intus planiuscula, tomento appresso incana, ½ poll. diametro. Seminum testa tenuis, endocarpio adhærens. Albumen nullum. Cotyledones crassæ, subhemisphæricæ, apice retusæ. Radicula brevis, infera.

Hab. Moolmein, *Griffith, Parish.*

I have examined several specimens, both in flower and in fruit.

GREWIA, *Linn.*

This the largest genus of *Tiliaceæ*, after deducting a considerable number of untenable species described from insufficient specimens, or reducible to slight varieties, will still be found to comprise about 60 species, either published or deposited in our herbaria—all natives of the tropical or subtropical regions of the Old World, two or three extending northward of the tropic in Eastern Asia, and a few southward in Africa or Australia. The greater number have a 3- or 4-celled ovary, with 2 or 4 ovules in each cell, and a 2- to 4-lobed drupe, and these were originally considered as essential characters of the genus. Such species, therefore, as were occasionally observed to have numerous ovules or a 2-celled ovary, or a perfectly entire fruit, have been at different times proposed as distinct genera under the names of *Microcos* and *Vincentia* (altered by Steudel to *Viticena*), and another species has been separated by Korthals under the name of *Omphacarpus*, on account of the fibrous dry nature of the sarcocarp. All these peculiarities are, however, now found to be connected with the more prevalent forms by a chain of intermediate species, and these proposed genera have been reunited with *Grewia*. It is probable that, on a careful review of the whole genus, *Microcos* and *Vincentia* will both of them constitute natural sections, the latter including the South African as well as the Madagascar species. The Mexican species, on the other hand, forming the genus *Belotia*, A. Rich., or *Adenodiscus*, Turczan., is probably quite distinct. The fruit is said to be capsular, with the seeds enveloped in long cottony hairs. Our specimens from various sources are all in flower only, so that we have been unable to verify this character; but we have no reason to doubt its accuracy.

COLUMBIA, *Pers.*

Of this tropical Asiatic genus our herbaria contain five species, including the *Glossospermum quinquealatum*, Wall. Catal. n. 1154 and 7841. The *Columbia inæquilatera*, Turczan., is identical with *C. serratifolia*, DC.

ERINOCARPUS, *Dalz.*

A single species is known, which was published by Dalzell in the 'Hortus Bombaiensis' under the name of *E. Nimmoana*, which by some error has been converted by Hasskarl, in describing it in his 'Retzia,' into *E. Kaimoni*.

LUHEA, *Willd.*

Of this beautiful South American genus Mr. Spruce's collections supply us with the two following new species, both very well marked:—

L. ALTHEÆFLORA, *Spruce*. Foliis coriaceis obovato-oblongis supra nitidis subtus ochraceo- v. canescenti-tomentosis, panicula densa, involucri foliolis sepalisque lanceolatis crassis rufo-tomentosis, petalis suborbiculatis, staminibus abbreviatis lana rufa involutis, staminibus antheriferis multo longioribus quam petala duplo brevioribus.—Arbor pulchra, 30-pedalis. Folia 6–10 poll. longa, 3–5 poll. lata, apice rotundata, basi subcordata. Paniculæ primariæ foliis subbreviores, in axillis superioribus dispositæ, paniculam formantes foliatam divaricatam. Pedicelli breves. Involucri foliola circa 9 lin. longa. Sepala paullo breviora. Petala fere pollicaria, purpurea. Staminum tubus brevis, annulatus, sterilia seu staminodia in annulum lanuginosum exteriorem coalita; fertilium filamenta 2–3 lin. longa. Antheræ oblongo-lineares, parvæ, basi bilobæ. Ovarium villosissimum. Ovula in loculis pauca. Stylus apice vix dilatatus.

Hab. In woods near San Carlos, on the Rio Negro, *Spruce*, n. 3484.

L. CYMULOSA, *Spruce*. Foliis oblique oblongis acuminatis supra nitidis subtus ochraceo-tomentellis, cymis folio multo brevioribus confertifloris, involucro subintegro caducissimo, sepalis cano-tomentosis, petalis lineari-cuneatis, staminibus pentadelphis paucis sterilibus vix

brevioribus.—Arbor magnitudine *Pyri Mali*. Folia 2–4 poll. longa, 1–1¼ poll. lata, supra medium denticulata v. integra, basi oblique subcordata. Cymæ florigeræ breves, fructiferæ 2 poll. diametro. Involucri bracteæ alabastrum juniorem involventes, mox hinc fissæ et longe ante anthesin deciduæ. Flores albi. Sepala lanceolata, vix semipollicaria. Petala paulo longiora, basi pubescentia. Stamina petalis breviora, ad tertiam partem pentadelpha et pubescentia, superne glabra; antheræ parvæ, oblongæ, versatiles. Ovarium villosissimum. Stylus glaber, superne valde dilatatus. Capsula circa 8 lin. longa, obovoidea, 5-angularis (fere 5-loba), pubescens, intus 5-locularis; septa spuria quarundam specierum desunt. Semina generis, alata, albumine parco; cotyledonibus ovatis, subcordatis; radicula iis dimidio breviore.

Hab. Frequent in the gapo of the Rio Negro and of the Solimoes, near their confluence, *R. Spruce*, n. 1594.

MOLLIA, *Mart.*

Mr. Spruce's collections have added the four following new species to the two already known of this genus:—

M. GRACILIS, *Spruce*. Foliis ovatis suboblongisve utrinque viridibus sparse substellato-lepidotis, sepalis lepidoto-incanis pedicello brevioribus.—Arbor tenuis, ramosa, 25-pedalis. Folia 2–4-pollicaria, ovalia, elliptica v. oblonga, breviter acuminata, apice obscure crenata, supra nitidula; axillæ venarum subtus barbatæ. Flores albi. Pedicelli pollicares. Sepala circa 9 lin. longa. Petala iis æquilonga, linearia. Ovarium lepidoto-tomentosum. Fructus non visus.

Hab. New Tarapoto, on the eastern side of the Andes of Peru, *R. Spruce*, n. 4949.

M. LONGIFOLIA, *Spruce*. Foliis oblongis integerrimis coriaceis supra glabris subtus sparse lepidotis, capsula apice integra.—Arbor 60-pedalis, radicibus emersis suffulta. Folia 5–7 poll. longa, concoloria v. subtus pallidiora. Flores mihi desunt. Pedicelli fructiferi pollicares. Capsula pollicaris, ala apicis coriacea-sublignosa, late rotundata, haud emarginata.

Hab. In the woods bordering the Rio Uaupes in North Brazil, *R. Spruce*, n. 2809.

M. LEPIDOTA, *Spruce*. Foliis ovatis suboblongisve coriaceis integerrimis supra sparse lepidotis subtus squamulis confertis argenteo-lepidotis, sepalis pedicello æquilongis.—Arbor nunc 15–20-pedalis, nunc 60–70 pedes attingens. Folia 3–5-pollicaria, plus minus acuminata, infra nitidula. Pedicelli nunc pollicares, fasciculati, nunc breviores pedunculo communi fulti. Flores albi. Sepala cano-tomentosa, pollicaria. Petala lineari-cuneata. Antheræ phalangium longiorum roseæ, brevi-

orum flavæ. Capsula orbiculata, apice breviter et obtusissime acuminata, ad margines coriaceo-attenuata at vix alata.

Hab. In the gapo of the Rio Negro in North Brazil, near the Lago de Alexâo, *R. Spruce*, n. 1591, and in the gapo of the Rio Uaupès, n. 2538 and 2576.

M. TOMENTOSA, *Spruce.* Foliis amplis ovatis acuminatis supra ad venas subtus undique pubescentibus, floribus fructibusque apice retusis rufo-villosis.—Arbor 25-pedalis. Folia 6–8-pollicaria, integerrima v. apicem versus remote dentata, subtus pube brevi haud densa rufescentia. Pedicelli fasciculati, pollicares, uti sepala (iis longiora) molliter rufo-villosi. Ovarium hirsutissimum. Capsula subpollicaris, apice angustissime alata, late rotundata, retusa nec emarginata.

Hab. In the gapo of the Rio Uaupès in North Brazil, near Panurè, *R. Spruce*, n. 2653.

TRICHOSPERMUM, *Blume.*

I have seen no specimens of Blume's species, but from the detailed character given by Clos in the 'Annales des Sciences Naturelles' (ser 4, v. viii. p. 265), I have no doubt that it is erroneously referred to *Bixaceæ*, and is a strict congener of, although not specifically identical with the *Diclidocarpus*, so well described and figured by A. Gray in the 'Botany of the American Exploring Expedition,' and of which I have examined specimens gathered in Feejee by Dr. Harvey. It has the fruit of *Mollia*, with very different flowers and seeds. Blume's name, having the right of priority, must of course prevail over A. Gray's.

GLYPHÆA, *Hook. fil.*

This genus, of which we have two west tropical African species, is remarkable for the close affinity in structure of its stamens, many-celled ovary, and indehiscent fruit, to those of the tropical American genus *Apeiba*, although the resemblance is disguised by differences in outward form and proportion more striking to the eye. The flowers in both genera are yellow.

APEIBA, *Aubl.*

The *A. Tibourbou*, Aubl., a very common Guivaa tree, was gathered also by Spruce in rocky places at Maypures, on the Orinoco, and distributed under n. 3625. He found it a tree of about forty feet. The membranous appendage of the anthers is shorter than the cells.

A. hypoleuca, Steud. in Flora, 1843. p. 735, from Surinam, *Hostmann*, n. 294, appears to be identical with the *A. Petoumo*, Aubl.

The following is new:—

A. MEMBRANACEA, *Spruce*. Foliis supra glabris subtus subcanescentibus, panicula laxa per anthesin ebracteata, antherarum membrana loculos 2–3-plo superante.—Fructus *A. asperæ*, a qua differt imprimis panicula ebracteata. Arbor est 25-pedalis, ramis longis, debilibus. Folia fere *A. asperæ* subtus plus minus canescentia v. pallide rufescentia. Flores lutei.

Hab. On the banks of the Cassiquiare in Venezuela, but sparingly, *R. Spruce*, n. 3204; near the Bodega de Remolina, in the province of Antioquia, New Grenada, *Purdie*.

PROCKIA, *P. Br.* (et *Linn.*)

The original *Prockia crucis*, Linn., variously associated by different authors with different species of *Bixaceæ*, has been again isolated by Bennett and referred by Clos to *Tiliaceæ*. This approximation has been confirmed by Seemann, who, in determining his specimens, recognizing in them all the characters of *Tiliaceæ*, did not think of searching in *Bixaceæ*, but described them as a new genus allied to *Sloanea*. Grisebach, however, in his recently published 'Flora of the British West Indies,' proposes to retain the plant in *Bixaceæ*, uniting it with *Banara* under the name of *Trilix*. In this I cannot agree with him; for whilst the habit and stipules of *Prockia* are quite as much Tiliaceous as Bixaceous, there is nothing in general character to prevail over the positive distinction of a completely divided ovary with axile placentation and hypogynous stamens in *Prockia*, from the 1-celled ovary with projecting parietal placentas and perigynous stamens of *Banara*. And with regard to the name, *Prockia* having been established by the elder Linnæus in his genera, must surely prevail over his son's more recent name of *Trilix*.

HASSELTIA, *H. B. et K.*

The perianth is usually described as a calyx with a double row of segments without petals. But in this case, as in *Banara*, *Homalium*, and other genera exhibiting an analogous structure, it appears to me more in conformity with established terminology to consider the outer valvate series alone as sepals, and the inner imbricate series as petals, notwithstanding their sepaloid aspect and persistence.

PLAGIOPTERON, *Griff.*

The opposite leaves, inflorescence, and numerous small flowers, give this plant a habit which does not at first view suggest a

Tiliaceous affinity, reminding one rather of some *Combretaceæ*; but the andrœcium, gynœcium, and fruit are quite Tiliaceous. Opposite leaves occur also in some species of *Sloanea*, *Elæocarpus*, &c., and the plan of inflorescence, although disguised, is essentially that of the majority of *Tiliaceæ*. The perianth is anomalous, appearing at first simple; but a careful examination shows minute external tooth-like segments, which are the true sepals; whilst the more conspicuous segments, although pubescent, sepaloid, and valvate, must be regarded as petals. An approach to a similar arrangement may be observed in *Tricuspidaria* and in those *Homalia*, in which the inner segments or petals enlarge much more than the outer ones or sepals.

SLOANEA, *Linn.*

The investigation of the uncertain characters by which the genera *Ablania*, Aubl., *Dasynema*, Schott, and *Dasycarpus*, Oerst., have been distinguished from *Sloanea*, having obliged me to examine and analyse all the species of the group of which we have specimens, I have drawn up a general synopsis, which I now give, premising that not one of the proposed characters has appeared sufficient to establish even good sections; the best division of the genus that I could form being derived from inflorescence.

Series I. PANICULATÆ.

Panicula terminalis corymbosa, folia superans. Antheræ lineares vix apiculatæ.

1. *S. corymbiflora*, DC. Foliis tenuiter coriaceis venulosis, sepalis membranaceis, alabastro oblongo.
2. *S. durissima*, Spruce. Foliis crasso-coriaceis nitidis, venulis inconspicuis, pedicellis incrassatis, sepalis crassis, alabastro ovoideo.
3. *S. laxiflora*, Spruce. Foliis tenuiter coriaceis venulosis, pedicellis vix incrassatis, sepalis crassis, alabastro ovoideo.
4. *S. paniculata*, Spruce. Foliis crasso-coriaceis nitidis basi cordatis, sepalis brevibus crassis, alabastro subgloboso.

Series II. CORYMBULOSÆ.

Pedunculi axillares, apice corymboso-paniculati, foliis (amplis) breviores.

5. *S. synandra*, Spruce. Sepalis crassis 9–10 lin. longis, antheris vix apiculatis subcohærentibus.

6. *S. Schomburgkii*, Benth. Sepalis crassis 6 lin. longis, antheris vix apiculatis.

7. *S. floribunda*, Spruce. Sepalis 4 lin. longis acuminatis, antheris tenuiter acuminatis.

Series III. Axillifloræ.

Pedunculi axillares racemoso-pluriflori v. rarius 1-flori.

§ 1. Stipulatæ, *stipulis bracteisque persistentibus.* (*Folia ampla.*)

* *Antheræ lineares acumine brevi.*

8. *S. dentata*, Linn. Foliis glabris, stipulis latis, racemis canescenti-tomentosis, calyce cyathiformi truncato 8–10-dentato.

9. *S. macrophylla*, Spruce. Foliis glabris, stipulis lanceolatis, racemis canescenti-tomentosis petiolo brevioribus, calyce 4–6-partito.

** *Antheræ oblongæ acumine longo.*

10. *S. pubiflora*, Planch et Lind. Foliis glabris, stipulis angustis, racemis molliter cano-pubescentibus petiolo longioribus, calyce 4–6-partito staminibus longiore.

11. *S. rufa*, Planch. Foliis subtus rufo-villosis, stipulis latis dentatis.

12. *S. Massoni*, Sw. Foliis glabris, stipulis linearibus, racemis pubescentibus, calyce 5–6-partito staminibus breviore.

§ 2. Brachystachyæ, *stipulis obsoletis v. caducis, racemis axillaribus brevibus.*

* *Antheris brevibus glabris v. vix puberulis, muticis v. brevissime apiculatis, capsulis echinatis.*

13. *S. obtusa*, Planch. Foliis obovatis 2–3-pollicaribus glabris, racemis laxe paucifloris, staminibus canescentibus, antheris subglobosis muticis.

14. *S. parviflora*, Planch. Foliis obovato-oblongis 4-6-pollicaribus glabris, floribus parvis confertis tomentosis, staminibus longe exsertis glabris, antheris breviter oblongis muticis.

15. *S. sinemariensis*, Aubl. Foliis ovatis obovatis oblongisve 4–12-pollicaribus glabris, racemis laxiusculis, antheris exsertis subglabris, apiculo brevi, filamentis hirtis.

16. *S. brevipes*, Benth. Foliis subtus rufo-pubescentibus, antheris puberulis, filamentis hirtis.

** *Antheris oblongis v. linearibus, uti filamenta hirtellis, calyce longioribus anguste apiculatis, capsulis rigide setosis.*

17. *S. stipitata*, Spruce. Foliis amplis lato-ovatis grosse dentatis, capsula stipitata.

18. *S. pubescens*, Benth. Foliis amplis ovatis plerisque dentatis subtus pubescentibus, inflorescentia laxa, capsula sessili.

19. *S. cuneifolia*, Mart. Foliis (circa 6-poll.) ovali-oblongis acuminatis integris glabris, petiolo pollicari, racemis brevibus subcorymbosis, capsula sessili.

20. *S. microcarpa*, Planch. Foliis *S. cuneifoliæ* nisi petiolo 1–4-lineari, floribus fructuque *S. guianensis.*

21. *S. guianensis*, Benth. Foliis 2–4-pollicaribus acuminatis, petiolo 6–9-lineari, racemis petiolo longioribus paucifloris.

22. *S. alnifolia*, Mart. Foliis 2–4-pollicaribus obtusis subrepandis, racemis petiolo brevioribus.

*** *Antheris pubescentibus, breviter apiculatis, calyce brevioribus v. vix longioribus, capsulæ setis densissimis mollibus hirtellis v. ad tomentum dense velutinum reductis.*

† *Foliis valde venosis acuminatis, racemis cano-puberibus.*

23. *S. riparia*, Gardn. Foliis glabris, petiolo 3–6-lin. longo, ovario deflorato obovoideo-subgloboso.

24. *S. monosperma*, Vell. Foliis glabris, petiolo brevissimo, ovario deflorato pyramidato-tetragono.

25. *S. hirsuta*, Planch. Foliis subtus pubescentibus, petiolo brevissimo.

†† *Foliis obovatis v. oblongis obtusissimis v. breviter et obtuse acuminatis, pedicellis apice* 3 (*rarius* 1 ?) *floris.*

26. *S. Fendleriana*, Benth. Sepalis canescentibus, antheris filamento subbrevioribus breviter apiculatis.

27. *S. quadrivalvis*, Seem. Sepalis glabris, antheris filamento longioribus longius apiculatis.

††† *Foliis acuminatis plerisque oppositis, pedunculis paucifloris.*

28. *S. laurifolia*, Benth. Antheris glabriusculis tenuiter apiculatis filamento hirsuto multo brevioribus.

29. *S. oppositifolia*, Spruce. Antheris puberulis breviter apiculatis filamento subæquilongis.

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30. *S. jamaicensis*, Hook. Pedunculis 1-floris, sepalis semipollicaribus, petalis brevioribus subtrifidis.

I. PANICULATÆ.

1. S. CORYMBIFLORA, *DC., Prod.* i. p. 516. Folia ovata, acuminata, 3–4 poll. longa, vix coriacea, reticulato-venosa, integerrima; petiolo pollicari. Panicula terminalis, corymbosa, floribunda. Alabastra oblonga. Sepala submembranacea, canescentia, 5–6 lin. longa. Antheræ lineares, 3–3½-lin. longæ, filamento brevi, apicula brevi. Stylus elongatus, subacutus, integer.

Hab. Cayenne, *Martin.*

2. S. DURISSIMA, *Spruce,* sp. n. Arbor recta, 40-pedalis, trunco tenui, diametro 3-unciali, ligno ferreo. Folia breviter petiolata, ovata v. obovata, brevissime acuminata, 3–4-pollicaria, integerrima, coriacea, nitida, rete venularum inconspicuo, basi cuneata v. rotundata, petiolo 2–3-lineari. Stipulæ inconspicuæ. Panicula corymbosa, terminalis, laxiflora. Pedicelli incrassati, canescentes, nunc semipollicares et ebracteati, nunc paulo longiores et bracteolis 1–2 parvis subulatis infra medium onusti. Sepala 4–5-lin. longa, albida, crassa, extus minute canescenti-tomentella. Stamina numerosissima, filamento brevissimo complanato; anthera lineari, 4-lin. longa, minute puberula, apice vix brevissime apiculata. Ovarium sessile, tomentosum, complete 4-loculare; ovulis plurimis biseriatis. Stylus pubescens, rigidus, integer, apice truncatus.

Hab. In woods about Panurè, on the Rio Uaupès in North Brazil, *R. Spruce,* n. 2788.

3. S. LAXIFLORA, *Spruce,* sp. n. Arbor 60-pedalis, corona ramosissima. Folia sparsa, in speciminibus floridis Spruceanis ovata, acuminata, 2–4-pollicaria, integerrima, basi rotundata, tenuiter coriacea, nitidula, reticulato-venosa; in fructifero Fendleriano paulo majora, rigidius coriacea et nitidiora. Panicula terminalis, foliata, laxa. Pedicelli semipollicares, tomentelli, vix incrassati. Alabastra ovoidea, 5-lin. longa, siccitate canescenti-tomentella. Sepala eburnea, decidua. Antheræ (*S. durissimæ*) puberulæ. Stylus puberulus, apice attenuatus. Ovarium complete 4-loculare, ovulis paucis. Capsula (in specimine

Fendleriano) 1½–2-pollicaris, aculeis pollicaribus rectis echinata, pericarpio crasso, intus monosperma.

Hab. In woods near the village of St. Isabel, on the Pacimone, an affluent of the Casiquiare in Venezuela, *R. Spruce*, n. 3376; near the colony of Tovar, Venezuela, *Fendler*, n. 1746.

4. S. PANICULATA, *Spruce*, sp. n. Folia oblonga, obtusa, 4–5-pollicaria, integerrima, basi anguste cordata, auriculis brevibus rotundatis, rigide coriacea, nitida, venulis inconspicuis. Panicula terminalis, foliata, subcorymbosa, laxe multiflora. Pedicelli semipollicares. Alabastra subglobosa, circa 2-lin. diametro. Antheræ quam in *S. durissima*, paulo minores, cæterum similes. Ovarium 4-loculare. Stylus apice attenuatus.

Hab. On the banks of the Rio Uaupès in North Brazil, *R. Spruce*, n. 2714.

II. CORYMBULOSÆ.

5. S. SYNANDRA, *Spruce*, sp. n. Arbor nobilissima, 100-pedalis, radicibus emersis compressis suffulta. Folia late ovata, obtusissima, 8-pollicaria, basi late rotundata v. subcordata, coriacea, elevato-penninervia et reticulato-venulosa; petiolo 1–2-pollicari, canescente. Pedunculi axillares, 3-pollicares, paniculam brevem dichotomam ferentes. Flores albidi. Sepala lato-lanceolata, crassa, canescentia, 9–10-lin. longa. Filamenta brevissima. Antheræ puberulæ, lineares, interiores 6-lin. longæ, vix apiculatæ, exteriores breviores, evidentius apiculatæ, omnes in massam densam leviter cohærentes et simul deciduæ, nec vere monadelphæ. Ovarium 4-gonum, 4-loculare; ovulis paucis, pendulis. Stylus elongatus, integer. Capsula junior oblongo-4-gona, tomentella, haud setosa, sed verisimiliter tardius setis armata.

Hab. In woods near the banks of the Rio Uaupès in North Brazil, *R. Spruce*, n. 2807.

6. S. SCHOMBURGKII, sp. n. Tota glabra. Rami crassi. Folia ovata v. elliptica, 8-pollicaria et majora, pleraque obtusa, basi cuneata; petiolo 1–2-pollicari, coriacea, nitidula, prominenter penninervia, reteque venularum sæpe conspicua. Pedunculi 1–1½-pollicares, axillares, crassi, subcompressi, cymam 1½-pollicarem 2–3-chotomam ferentes. Sepala semipollicaria, crassa, canescenti-tomentella. Antheræ lineares, 4–5 lin. longæ, vix apiculatæ, fere glabræ, filamentis brevissimis. Ovarium vix complete 4-loculare, placentis medio conniventibus nec coadunatis. Stylus elongatus, integer.

Hab. British Guiana, *Rob. Schomburgk*, 2nd coll. n. 773; *Rich. Schomburgk*, n. 1440.

7. S. FLORIBUNDA, *Spruce*, sp. n. Arbor 20–30-pedalis. Folia elliptico-oblonga, acuminata, 8-pollicaria et longiora, crasso-coriacea, nitida, venis primariis prominentibus et rete venularum conspicua,

basi rotundata; petiolo 1–2-pollicari. Pedunculi axillares, 3–4-pollicares, paniculam corymbosam demum bis terve 3-chotomam seu umbellatam circa 4 poll. latam ferentes. Pedicelli 8–9 lin. longi. Flores nutantes, in vivo eburnei. Sepala 4-lin. longa, acuminata. Filamenta brevia, pubescentia. Antheræ glabriusculæ vix duplo longiores, acumine tenui anthera ipsa vix dimidio breviore. Ovarium (superne vix complete) 4-loculare. Stylus integer, acutiusculus.

Hab. In damp woods near San Carlos on the Rio Negro, in North Brazil, *R. Spruce*, n. 3680.

III. AXILLIFLORÆ STIPULATÆ.

8. S. DENTATA, *Linn. Spec. Pl.* p. 730. Folia 8–13-pollicaria, sinuato-dentata, obtusa v. acuminata; petiolo 1–4-pollicari. Calyx cyathiformis, truncatus, 6–10-dentatus. Antheræ lineares, pubescentes, apice connectivo glabro breviter apiculatæ. Ovarium 4-loculare (ex Aubletio interdum 5–6-loculare). Stylus integer v. apice brevissime lobatus. Fructus setis longis subulatis flexuosis densissime echinatus.

Hab. Cayenne, *Martin*; British Guiana, *Rob. Schomburgk*, 2nd coll. n. 768, *Rich. Schomburgk*, n. 1388. Also probably Surinam, *Hostmann*, n. 1025; but the calyx is wanting in my specimens of the latter.

9. S. MACROPHYLLA, *Spruce*, sp. n. Arbor gracilis, 18-pedalis, ramis paucis elongatis supra medium foliiferis floridisque. Folia ampla, fere *S. dentatæ*, majora sesquipedalia, petiolo 3–7-pollicari, late oblonga v. ovata, obtusa v. acuminata, late sinuato-subdentata. Stipulæ lanceolatæ, crassiusculæ, persistentes. Racemi petiolo breviores, canescenti-tomentelli. Pedicelli fere pollicares, bracteis subtendentibus brevibus, ovatis, persistentibus. Calyx hemisphæricus, ruber. Sepala 5–8, ovata, utrinque tomentosa, demum recurva, uniseriatim valvata v. 1–2 interiora. Stamina *S. dentatæ*, in vivo flava, pubescentia, linearia, apicula brevi glabra. Stylus subinteger. Ovarium 5 (4–6?) -loculare. Capsula setis pollicaribus rectis rigidis subspinescentibus densissime echinata.

Hab. In the gapo on the Rio Uaupès in North Brazil, *R. Spruce*, n. 2478.

10. S. PUBIFLORA, *Planch. et Lind. in Herb. Hook. MS.* Arbor. Folia ovata v. oblonga, 6–8-pollicaria, obtusa, vix sinuata, coriacea, glabra; venis primariis venulisque transverse reticulatis, subtus prominentibus; petiolo ½–1-pollicari. Racemi axillares, floribundi, 2–3-pollicares, molliter pubescentes. Stipulæ et bracteæ lineari-lanceolatæ, persistentes. Flores nutantes. Sepala 6–10, 1–2-seriata, 3-lin. longa, pubescentia. Antheræ oblongæ, filamento v. apicula tenui hispidula vix longiores. Ovarium 5 (4–6?) -loculare. Stylus apice breviter divisus.

Hab. In the Sierra Nevada, in the province of Rio Hacha, in New Grenada, at an altitude of 5000 feet, *Schlim*, n. 839.

11. S. RUFA, *Planch. in Herb. Hook. MS.* Folia ovata, obtusa, basi cordata, ¾–1-pedalia, coriacea, supra glabra et nitida, subtus rufo-pubescentia v. villosa; venis primariis, venulis transversis, et rete minore prominentibus; petiolo 1–3-pollicari. Stipulæ ovatæ, fimbriatæ, persistentes. Racemi breves, villosi. Pedicelli 2–3-lin. longi. Sepala 4–6, intus glabriuscula, 2-lin. longa. Staminum nonnisi fragmenta adsunt, iis *S. pubifloræ* similia videntur. Ovarium 4 (5–6?) -loculare, apice incomplete divisum. Stylus apice divisus.

Hab. Cayenne, *Martin.*

12. S. MASSONI, *Sw.*; *Griseb. Fl. Brit. W. Ind.* p. 99.

Hab. Guiana and the West Indies.

The diagnosis given above is taken from Grisebach's description, as the specimens are not yet returned to the Kew Herbaria.

IV. AXILLIFLORÆ BRACHYSTACHYÆ.

13. S. OBTUSA, *Planch. in Herb. Hook.* (Adenobasium obtusifolium, *Moric. Pl. Nouv. Amer.* p. 83, t. 55.)

Hab. Province of Bahia, Brazil, *Blanchet*, n. 1659.

14. S. PARVIFLORA, *Planch. in Herb. Hook.* (Dasynema obtusum, *Splitg. Pl. Nov. Surim.* p. 4; *Van Hoev. et De Vriese Tijdschr.* ix. p. 98; *Schlecht. et Mohl, Bot. Zeit.* i. p. 95).

Hab. In woods near Port Belair, Surinam, *Splitgerber*; also *Hostmann*, n. 412.

15. S. SINEMARIENSIS, *Aubl. Pl. Gui.* p. 535, t. 212; *Griseb. Fl. Brit. W. Ind.* p. 99.

Hab. British Guiana, *Parker*; *Rob. Schomburgk*, 1st coll. n. 1021 (in part) and 1044; St. Ann's Mountain, Trinidad, *Purdie*; St. Vincent's, *Anderson.*

Some, however, of Schomburgk's and other flowering specimens are rather doubtfully referred to this species.

16? S. BREVIPES, sp. n. Folia obovata v. obovali-oblonga, 3–8 poll. longa, obtusissima, coriacea, supra glabra, subtus rufo-puberula; venis primariis transversis reteque venularum elevatis. Petioli 1–4-lin. longi, uti ramuli molliter rufo-pubescentes. Racemi breves, floribundi. Bracteæ parvæ. Pedicelli circa 2-lin. Calyx pubescens; sepalis 4–6, vix 1½-lin. longis. Stamina exserta; filamenta villosa; antheræ oblongæ, iis breviores, puberulæ, apicula brevi obtusa. Stylus apice breviter divisus.

Hab. British Guiana, *Rob. Schomburgk*, 1st coll. n. 1021.

Mixed with the last, of which it may possibly prove to be a variety, notwithstanding the form and the pubescence of the leaves.

17. S. STIPITATA, *Spruce*, sp. n. Arbor dense ramosa, 30-pedalis. Folia late ovata, 5–6-pollicaria, grosse dentata, glabra; venis primariis

subtus valde elevatis; venulis transversis, conspicuis; petiolo 1–1½-pollicari. Racemi laxi, fructiferi, 2–3-poll. longi, subcompositi. Calyx 4–5-fidus, sepalis circa 2 lin. longis. Staminum nonnisi fragmenta adsunt, hirta videntur; antheris apiculatis. Capsula fere *S. sinemariensis* nisi stipite lineam longo fulta.

Hab. On the Casiquiare above the mouth of the Pacimone, and very common in Cunucunuma, *R. Spruce*, n. 3197.

18. S. PUBESCENS, *Benth.* (Dasynema pubescens, *Poepp. et Endl. Nov. Gen. et Sp.* iii. p. 74, t. 284.)

Hab. In woods near Ega, on the Amazon, in North Brazil, *Poeppig.*

I have not seen his specimens, but others from Cayenne, *Martin*, answer perfectly to his figure and description, except that the pedicels are rather shorter.

19. S. CUNEIFOLIA, *Mart. Herb. Fl. Bras.* p. 94.

Hab. In woods on the Amazon, in North Brazil, *Martius.*

I have not seen authentic specimens of this species, but one of *Blanchet's* from tropical Brazil, n. 2356, agrees with Martin's character. The flowers and stamens are those of *S. guianensis*, of which it may prove to be a variety. The leaves are larger, with petioles an inch long.

20. S. MICROCARPA, *Planch. in Herb. Hook.* sp. n.? Glabra. Folia obovato-oblonga, acuminata, 4–6-pollicaria, basi angustata; petiolo 1–3-lin. longo; venis primariis subtus elevatis. Pedunculi breves, pauciflori. Capsula sessilis, parva, setis rigidis echinata, fere *S. guianensis.*

Hab. Cayenne, *Martin.*

21. S. GUIANENSIS, *Benth.* (Ablania guianensis, *Aubl. Pl. Gui.* p. 585, t. 234). Folia 3–4-poll. longa, petiolo 6–9-lin. longo. Antheræ exsertæ, hirtellæ, filamento breviores, apicula quam anthera ipsa dimidio fere breviore.

Hab. Cayenne. I have a specimen derived from the Lambertian Herbarium, but without the collector's name.

22. S. ALNIFOLIA, *Mart. Herb. Fl. Bras.* p. 94, n. 87. Folia 3–4 poll. longa, obtusa v. brevissime acuminata, apicem versus subrepanda, basi rotundata; petiolo semipollicari. Racemi petiolo breviores.

Hab. In woods near Rio Janeiro, *Martius, Pohl, Mrs. Graham.*

23. S. RIPARIA, *Planch. in Herb. Hook.* (Dasynema riparium, *Gardn. in Hook. Lond. Journ. Bot.* ii. p. 324). Glabra. Folia ovali-elliptica v. oblonga, acuminata, 3–4-pollicaria; petiolo 3–6-lineari. Racemi laxi, petiolo longiores; pedicellis subsemipollicaribus. Sepala 4, 2 lin. longa. Antheræ puberulæ, filamento sublongiores, apiculatæ. Ovarium defloratum obovoideo-subglobosum, haud angulatum. Capsula monosperma, valvulis crassis, vix pollicaribus. Setæ demissæ, mol-

lissimæ, hirtellæ, in capsula juniore tomentum breve velutinum formantes, in matura 2 lin. longæ.

Hab. In the Organ Mountains near Rio Janeiro, *Gardner*, n. 327.

24. S. MONOSPERMA, *Vell. Fl. Flum.* v. t. 100 (Adenobasium salicifolium, *Presl, Symb. Bot.* p. 40, t. 27.—Dasynema ochrocarpa, *Mart. Herb. Fl. Bras.* n. 831). Similis *S. ripariæ.* Folia angustiora, paulo minora; petiolo nunc brevissimo, rarius 2–3-lin. longo. Pedunculi breves, pauciflori. Flores minores, evidentius angulati. Ovarium defloratum pyramidato-tetragonum, tomentellum. Capsula fere *S. ripariæ.*

Hab. In the province of Minas Geraes, Brazil, *Claussen*; on the Corcovado Mountain near Rio Janeiro, *Gardner*, n. 826.

25. S. HIRSUTA, *Planch. in Herb. Hook.* (Dasynema hirsutum, *Schott in Spreng. Syst. Cur. Post.* 408). Folia *S. monospermæ* v. angustiora, subtus pubescentia. Ramuli et petioli molliter villoso-pubescentes. Flores in speciminibus desunt. Capsula *S. ripariæ*, setis tamen paulo longioribus rigidioribusque.

Hab. In woods at Tijuca near Rio Janeiro, *Gardner*, n. 5374.

26. S. FENDLERIANA, sp. n. Ramuli et inflorescentia cano-puberuli. Folia obovata v. obovali-oblonga, obtusissima, 1½–2 poll. longa, supra glabra et nitidula, subtus juniora canescentia, adulta fere glabra; venis primariis elevatis; petiolo 3–4-lin. longo. Pedunculi subsemipollicares, 1–3-flori. Flores nutantes. Sepala 4, subcanescentia, 3 lin. longa. Antheræ hirtellæ, breviter acuminatæ, filamento paulo breviores.

Hab. Near the colony of Tovar, in Venezuela, *Fendler*, n. 2489.

27. S. QUADRIVALVIS, *Seem. Bot. Her.* p. 85, t. 15 (Dasycarpus quadrivalvis, *Oerst. Pl. Nov. Centr. Amer.*). Pedunculi longe 3-flori, uti sepala glabri. Antheræ puberulæ, filamento longiores et longiuscule apiculatæ. Capsula velutina.

Hab. Central America, province of Veraguas, *Seemann*, and of Nicaragua, *Oersted*.

28. S. LAURIFOLIA, *Benth.* (Dasynema laurifolium, *Benth. in Hook. Journ. Bot.* iv. p. 132). Arbor dumosa, 30-pedalis. Flores albidi. Antheræ glabriusculæ, tenuiter apiculatæ, filamento hirsuto multo breviores.

Hab. On the Rio Negro in North Brazil, *Rob. Schomburgk*, 1st coll. n. 936; in the gapo below San Isabel, *R. Spruce*, n. 1961.

29. S. OPPOSITIFOLIA, *Spruce*, sp. n. Affinis *S. laurifoliæ.* Folia (laurina) 4–8-pollicaria, ovato-lanceolata v. oblonga, longiuscule acuminata, basi angustata; petiolo ½–1-pollicari; venis primariis prominentibus, venulis parum conspicuis. Pedunculi quam in *S. laurifolia* longiores, tenuiores, laxe pauciflori, uti sepala glabri. Flores minores.

Sepala 2 lin. longa. Antheræ puberulæ, filamento subæquilongæ, apiculo brevi.

Hab. Near San Carlos on the Upper Rio Negro, *R. Spruce*, n. 3689.

30. S. JAMAICENSIS, *Hook. Ic. Pl.* t. 693 to 696; *Griseb. Fl. Brit. W. Ind.* p. 98. Pedunculi 1-flori. Sepala semipollicaria.

Hab. Jamaica, *Purdie*.

This species is remarkable for its large solitary flowers, and for the presence of petals, which are sometimes notched or toothed, showing an approach to *Echinocarpus* and *Elæocarpus*.

ECHINOCARPUS, *Blume*.

This Asiatic genus, very shortly characterized by Blume in his 'Bijdragen,' was placed by him among *Bixaceæ*, probably on account of some external analogy of its fruit with that of *Bixa*, the ovary not having been examined. Clos, describing with rather more detail an incomplete specimen of Zollinger's, was still unable to ascertain the structure of the ovary, and consequently has not removed the plant from *Bixaceæ*. We have now, however, in the collections of Griffith, and of Hooker and Thomson, five Indian species besides an Australian one from other collectors, which enable us fully to complete the character of the genus, and to fix its place in close proximity to the American *Sloanea*, connecting them with the Asiatic *Elæocarpus*. The large convex disk, pitted all over with the scars of the stamens after their fall, the acuminate anthers opening towards the summit, the ovary usually 4- or 5-celled with several ovules in each cell, the simple style, the echinate or densely velvety capsule opening in thick woody valves, and containing one or very few seeds, and, as far as we know, the seeds themselves, are all precisely those of *Sloanea*. The generic distinction lies in the perianth, which is somewhat anomalous in the order; the 4 or 5 sepals are decidedly imbricate in æstivation; and the petals, always present, usually of a greenish calycine aspect, although thinner than the sepals, are as long as them or longer, usually very broad and more or less lobed. The latter character connects the genus with *Elæocarpus*, from which it abundantly differs in the sepals, in the disk, and in the fruit.

The following are the species now known:—

§ 1. *Capsula aculeis longis, rigidis echinata.*

1. *E. murex.* Foliis oblongis sublanceolatisve acuminatis (2–4-poll.) glabris, fructus aculeis basi incrassatis.

2. *E. Sigun.* Foliis ovatis acutis acuminatisve (4–6-poll.) glabris, fructus aculeis subfoliatis.

3. *E. assamicus.* Foliis ovalibus obovalibusve brevissime cuspidatis (6–8-poll.) glabris, fructus aculeis subulatis.

4. *E. sterculiaceus.* Foliis ovalibus obovalibusve brevissime cuspidatis (5–10-poll.) subtus pubescentibus, fructus aculeis subulatis.

§ 2. *Capsula setis brevibus, densissimis, mollibus quasi velutina.*

5. *E. tomentosus.* Foliis ovalibus subtus tomentosis subrufis, petalis brevibus.

6. *E. australis.* Foliis obovali-oblongis sinuato-dentatis glabris (petalis angustis?).

7. *E. dasycarpus.* Foliis oblongis obovalibusve integerrimis serrulatisque glabris, petalis latis calyce longioribus.

1. E. MUREX, sp. n. Tota glabra excepto tomento tenuissimo pedunculorum. Folia quam in cæteris speciebus minora et angustiora, supra medium longiuscule acuminata, integerrima, basi rotundata, rigidule membranacea, penninervia et reticulato-venulosa; petiolo subsemipollicari. Flores non vidi. Pedunculus fructifer pollicaris. Capsula ovoideo-globosa, sesquipollicaris, in valvulas 4–5 crassissime lignosas dehiscens; aculei semipollicares, minus conferti quam in *E. assamico* et *E. sterculiaceo*, basi in tuberculum incrassati.

Hab. Khasia, at an elevation of 3000–5000 feet, *Hooker and Thomson*, distributed as *Echinocarpus* n. 5.

2. E. SIGUN, *Blume*; *Clos. in Ann. Sc. Nat. Par.* ser. 4, viii. p. 266.

Hab. Java, *Blume*; *Zollinger*, n. 3169.

I have seen no specimen, but from Clos's description it differs from *E. murex* and *E. assamicus* both in the form of the leaves and the prickles of the capsule.

3. E. ASSAMICUS, sp. n.

Hab. Upper Assam, *Griffith.*

This is no doubt the "altera species" alluded to by Griffith in his 'Itinerary Notes,' Posthumous Papers, ii. p. 169. It is closely allied to the *E. sterculiaceus* in the form, size, and texture of the leaves, in the young ovary, stamens and fruit, and may possibly prove to be a variety only of that species; but the leaves are perfectly glabrous, except small tufts in the axils of the veins, and are perhaps more narrowed below the middle. The sepals and petals have all fallen off from our specimens.

4. E. STERCULIACEUS, sp. n. (Elæocarpea, *Griff. Itin. Not.* n. 866 in Posth. Pap. ii. p. 168). Folia latiuscula, ovalia v. obovalia, versus

apicem rotundata, acumine brevi obtuso, margine leviter et remotiuscule serrata, ima basi obtusa et sæpius leviter cordata, subtus pube laxa copiosa vestita. Petioli ½–1-pollicares. Pedicelli tomentosi, 1–1½-pollicares. Perianthii nonnisi reliqua pauca vidi. Sepala, teste Griffithio, oblonga sunt, numero 4 v. 5, et petala numero varia, sæpius biseriata, 4 exteriora sepalorum longitudine, interiora 4 minora. Stamina in speciminibus supersunt pauca. Antheræ lineari-oblongæ, filamento hirtello paulo breviores. Ovarium defloratum, 4–5-costatum, tomentosum, cito aculeis obtegitur. Capsula ultrapollicaris, aculeis subulatis rectis 8–9 lin. longis densissime armata.

Hab. Bootan, *Griffith*; Sikkim, *J. D. Hooker*, distributed as *Echinocarpus* n. 2.

I have adopted the specific name proposed by Griffith on account of the general resemblance of the tree to a *Sterculia*.

5. E. TOMENTOSUS, sp. n. Arbor altissima. Folia pleraque 6–8 poll. longa, 3–4 poll. lata, breviter acuminata, margine serrato-crenata, basi rotundata, rarissime ad petiolum subcordata, crassiora quam in *A. sterculiacea*, supra glabra sed opaca, subtus pube brevi subferrugineo molliter tomentosa; petiolo 1–2-pollicari. Pedicelli semipollicares v. paulo longiores, recurvi, tomentosi, apice incrassati. Flores fere ½ poll. diametro. Sepala 4–5, ovata, obtusa, tomentosa. Petala subbreviora, latissima, lobata. Antheræ filamento subæquilongæ. Capsula ovoidea, sesquipollicaris, lignosa, 4–5-valvis, setis confertissimis 1-lin. longis quasi velutina.

Hab. Bootan, *Griffith*; Sikkim, *J. D. Hooker*, distributed as *Echinocarpus* n. 1.

6. E. AUSTRALIS, sp. n. Arbor 80-pedalis. Folia nunc fere pedalia, obovali-oblonga, supra medium longe angustata, nunc breviora, obovata v. ovalia, omnia irregulariter sinuato-dentata, prope basin plus minus angustata, ima basi obtusa v. subcordata, rigide membranacea et utrinque glaberrima; petiolo ½-poll. v. rarius 1 poll. longo. Pedunculi ad apices ramorum crebri, pollicares, vix tomentelli. Sepala in speciminibus pauca supersunt, anguste ovata v. oblonga, obtusa. Petala vix latiora videntur, sed in speciminibus nostris imperfecta. Capsulæ juniores setis brevibus confertissimis velutinæ.

Hab. Eastern Australia; in the scrub near Dunuduni, Moreton Bay district, *Macleay*; at Kiama, in New South Wales, *Harvey*.

7. E. DASYCARPA, sp. n. Arbor procera. Folia variabilia, pleraque anguste ovalia v. late oblonga, acuminata, 4–5-pollicaria, nunc obovali-oblonga v. angustiora, 6–9-poll. longa, rarius iis *E. muricis* subsimilia, omnia glabra, membranacea et basi sæpius acutata v. angustata; petiolo subsemipollicari. Pedunculi ad apices ramorum crebri, 1½-pollicares. Sepala 4 v. rarius 5, late ovalia v. orbiculata. Petala sepalis dimidio ad duplo longiora, latissima, lobata, pallide flavovirentia. Antheræ oblongæ, filamento breviores. Capsula pollicaris,

Blume under the name of Pangiaceæ, without otherwise modifying its general limits, retaining in it *Banara* and its allies, which have decidedly perigynous stamens. It is, probably, this perigynous character of the latter genus which has induced Grisebach, in his 'Flora of the British West Indies' and 'Erläuterungen ausgewählter Pflanzen des tropischen Amerikas,' and Harvey, in his 'Flora Capensis,' to bring Samydeæ into the same group. Harvey, moreover, connecting these with such Homalineæ as have an entirely free ovary, includes also the whole of the latter group under one Order of Bixaceæ. The course we propose to adopt is so far to follow these authors as to unite DeCandolle's four Orders into two; Bixaceæ with hypogynous, and Samydaceæ with perigynous stamens; transposing from the former to the latter the genus *Banara*, in which the perigynous character is very decided, and accompanied by others derived from the floral envelopes. These accessory characters will also assist us in classing some other genera whose staminal insertion is somewhat ambiguous.

The Order Bixaceæ, thus constituted, has for its chief prevailing characters indefinite hypogynous stamens, a compound unilocular ovary with parietal placentas, anatropous ovules, and a straight embryo immersed in a fleshy albumen. The sepals are imbricate or open in the bud; the petals, when present, much imbricate, and larger, more petaloid and more deciduous than the sepals, or passing gradually into them. The stem is woody, the leaves alternate, the stipules small and usually deciduous. Three small exceptional genera have definite or subdefinite stamens, two have a curved embryo, two have the placentas united in the axis; all, however, are here admitted on account of a combination of other characters which render them inseparable from undoubted Bixaceous genera.

The Samydaceæ, extended as we propose so as to include Homalineæ, have indefinite or more or less definite perigynous stamens, with the ovary and embryo of Bixaceæ. The sepals are valvate or slightly imbricate; the petals, when present, regularly alternate with the sepals, are of a nearly similar consistence, and persist with them so as to have been usually described as an inner series of sepals. The stem is woody, with alternate leaves, and small, usually deciduous stipules, as in Bixaceæ.

The most important characters distinguishing the Orders nearest allied to Bixaceæ or Samydaceæ are the exalbuminous curved embryo and usually dimerous flowers of Capparideæ, the orthotropous ovules of Cistineæ, the five erect introrse anthers, connivent or connate in a ring round the ovary of Violaceæ, the axile placentation and valvate sepals of Tiliaceæ, and among Calycifloræ the corona of Passifloraceæ (which include *Malesherbia*).

With regard to the distribution of the genera of Bixaceæ into tribes, the most recent, founded on a general survey of the Order, is that proposed by Clos in the above-mentioned memoir in the 'Annales des Sciences Naturelles;' for Harvey's and Grisebach's are partial only, based the one upon the Cape genera, the other on the West Indian ones. Clos proposes five tribes—Flacourtieæ, Azareæ, Lætieæ, Bixeæ, and Pangieæ. The last of these, Pangieæ, is well marked by the scales at the base of the petals, and is by some considered as constituting a distinct Order. The Azareæ consist chiefly of *Banara*, *Kuhlia*, and *Pineda*—all decidedly perigynous, and which we propose, as above mentioned, to remove, as one genus, to Samydaceæ. *Azara* itself is, however, hypogynous or nearly so, and appears to us to be much nearer allied to *Scolopia*, and to belong to the tribe of Flacourtieæ, in which we would include Lætieæ rather as a subtribe than as a distinct tribe. On the other hand, as we propose bringing *Cochlospermum* and *Amoreuxia* next to *Bixa*, we would distinguish the Bixeæ by the peculiar anthers and some other characters common to these genera only, and separate from them *Oncoba*, *Mayna* and their allies into a distinct tribe, which we would name *Oncobeæ*.

The following would then be our arrangement of the Order:—

Tribus I. BIXEÆ. Flores hermaphroditi v. rarius polygami. Petala ampla, esquamata, contorta. Antheræ apice biporosæ v. breviter bivalves. Endocarpium membranaceum, solubile.

Genera:—1. Cochlospermum, *Kunth.* 2. Amoreuxia, *Moç. et Sess.* 3. Bixa, *Linn.*

Tribus II. ONCOBEÆ. Flores dioici v. polygami. Sepala et petala valde imbricata, hæc majora esquamata. Antheræ lineares, birimosæ.

Genera:—4. Oncoba, *Forsk.* 5. Mayna, *Aubl.* (Lindackeria, *Presl.*) 6. Carpotroche, *Endl.* 7. Dendrostylis, *Karst. et Triana.*

Tribus III. FLACOURTIEÆ. Flores hermaphroditi v. dioici. Petala 0 v. sepalis parum majora, imbricata, esquamata. Antheræ birimosæ, breves v. rarius (in flore apetalo) lineares.

Subtribus 1. LÆTIEÆ. Flores hermaphroditi v. rarius polygami.

* *Stamina* ∞. *Antheræ lineares. Petala* 0.

Genus :—8. Ryania, *Vahl.*

** *Stamina* ∞. *Antheræ breves.*

a. Sepala valde imbricata.

Genera :—9. Lætia, *Linn.* 10. Ludia, *Lam.* 11. Aphloia, *Benn.* (Neumannia, *A. Rich.*) 12. Rawsonia, *Harv.*

b. Sepala parum imbricata v. aperta.

Genera :—13. Azara, *Ruiz et Pav.* 14. Scolopia, *Schreb.* (Phoberos, *Lour.*).

*** *Stamina* 5–10.

Genus :—15. Erythrospermum, *Lam.*

Subtribus 2. EUFLACOURTIEÆ. Flores dioici v. rarius polygami. Antheræ breves.

* *Bacca.*

Genera :—14. Flacourtia, *Lhér.* 15. Bennettia, *Miq.* 16. Xylosma, *Forsk.* (Hisingera, *Hellen.*) 17. Dovyalis, *E. Mey.* 18. Aberia, *Hochst.*

** *Capsula.*

Genus :—19. Trimeria, *Harv.* (Monospora, *Hochst.*).

Tribus IV. PANGIEÆ. Flores dioici. Petala basi squama epipetala v. sublibera aucta.

* *Calyx primum integer, per anthesin varie rumpens.*

Genera :—20. Pangium, *Reinw.* 21. Gynocardia, *R. Br.* 22. Bergsmia, *Blume.* 23. Trichadenia, *Thw.*

** *Sepala distincta.*

Genera :—24. Taraktogenos, *Hassk.* 25. Hydnocarpus, *Gærtn.* 26. Kiggelaria, *Linn.*

COCHLOSPERMUM, *H.B. et K.*

Planchon, in his valuable memoir on this beautiful and interesting genus (Lond. Journ. Bot. vi. p. 294), has well pointed out its discrepancies from Ternstrœmiaceæ and Cistaceæ, to both of which it had been referred; but he proposes to consider it as the type of

a distinct family, most nearly allied in his opinion to Geraniaceæ and to Bombaceæ, from both of which it appears to us to be far removed in its calyx, stamens, gynæcium, fruit and seeds, although the wool of the latter as well as the foliage may remind us of Bombaceæ. He hints, however, at a connexion with *Bixa* as requiring further investigation; and this has proved to be so close, notwithstanding the exceptional character of the seeds, that we have no hesitation in bringing it into the same tribe. It agrees with *Bixa* in habit, in the yellow juice, palmately veined leaves and large flowers, in the insertion and arrangement of the deciduous sepals and petals, in the large number of hypogynous stamens with peculiar anthers, in the style, and in the valvular rather large capsules, with a membranous more or less separable endocarp. It has three instead of two placentas, which, although in some species they are scarcely more prominent than in *Bixa*, yet in other species form semisepta, especially near the base, dividing the capsule into three more or less complete cells; but the most striking difference is in the cochleate more or less woolly or hairy seeds, with a very much curved embryo. This character, however, will not alone suffice for the establishment of a distinct natural order, especially as it does not exist in *Amoreuxia*. To the species of *Cochlospermum* enumerated by Planchon, we have, as yet, no additions to make.

AMOREUXIA, *Moç. et Sess.*

Planchon, in the above-mentioned memoir, has well shown that this genus, identical with *Euryanthe*, Schlecht., must, in the series of families, follow the fate of *Cochlospermum*. Like the latter genus, it has the flowers, valvular capsule, and soluble endocarp of *Bixa*. The seeds, unknown to Planchon, but since received amongst the rich collections of Mr. Charles Wright, and accurately described and figured by A. Gray, are much nearer to those of *Bixa* than of *Cochlospermum*, only differing from the former by the cotyledons more or less bent or folded. The placentæ, however, are completely united in the axis of the ovary and capsule, dividing them into three perfect cells. But here again is a solitary character, no more available for the establishment of a distinct Order in this case than in that of *Flacourtia*.

BIXA, *Linn.*

Of this genus there is one species, furnishing the arnotto of commerce, which, by long cultivation within the tropics, in Africa and Asia as well as in its native American continent, appears to have established several more or less permanent varieties, differing in the form of the leaves, the size and colour of the flowers, the naked or muricate capsules, &c.; several of which varieties have been proposed as distinct species, which we would agree with Clos in rejecting. There may be more doubt respecting the second and more rare species adopted by Clos, *B. platycarpa*, Ruiz and Pav., from Peru, New Grenada, and Central America, in which the fruit is depressed, globular or reniform, and always very obtuse or flat at the top, not acute as in *B. Orellana.* We have no materials sufficient to judge how far these characters may correspond with any differences in the flowers. See Clos in 'Ann. Sc. Nat. Par.,' ser. 4, viii. p. 260.

ONCOBA, *Forsk.*

We have nothing to add to the synonymy and enumeration of species of this genus given by Planchon in a note to the above-mentioned paper. (Hook. 'Lond. Journ. Bot.' vi. p. 295.)

MAYNA, *Aubl.*

Considerable confusion as to the circumscription and species of this genus has arisen, partly from the errors which had crept into Aublet's original character and figure, partly from the similarity of the male flowers, by far the most common in our herbaria, in the two genera *Mayna* and *Carpotroche.* The female flowers are readily distinguishable, the placentæ appear never to be more than three in the true *Maynas*, the styles are completely united, and the characteristic tubercles or spines of the fruit may be seen already on the scarcely enlarged ovary. The genus is entirely Tropical-American; it includes *Lindackeria* of Presl, and consists, as far as hitherto known, of the following seven species:—

* *Staminum filamenta basi in columnam conniventia.*

1. M. odorata, *Aubl. Pl. Gui.* p. 921. t. 352.

Hab. Guiana.

Of this I have seen no specimen precisely answering to Aublet's figure as to foliage and inflorescence.

2. M. latifolia (Lindackeria latifolia, *Benth. in Kew. Journ. Bot.* iii. p. 118).

Hab. North Brazil, near Obidos, on the Amazon, *R. Spruce.*

** *Staminum filamenta laxiora.*

3. M. PALUDOSA, *Benth. in Hook. Journ. Bot.* iv. p. 114. Capsula 1 poll.

diametro, tuberculis crassis conicis muricata; valvulis 3, lignosis, per dehiscentiam recurvis.

Hab. Guiana and N. Brazil.

Lindackeria Maynensis, Poepp. et Endl. Nov. Gen. et Sp. iii. p. 63. t. 270, appears to be the same species.

4. M. LAXIFLORA, *Benth. in Hook. Journ. Bot.* iv. p. 114.

Hab. Guiana.

This has the fruit of *M. paludosa*, of which it may prove to be a mere variety.

5. M. LAURINA (Lindackeria laurina, *Presl, Rel. Hœnk.* ii. p. 89. t. 65).

Hab. West Mexico, *Hœnke.*

I have not seen any specimens.

6. M. PAUCIFLORA (Lindackeria pauciflora, *Benth. in Kew Journ. Bot.* iii. p. 118).

Hab. North Brazil; Tanaii, near Para, *R. Spruce.*

7. M. OVATA, sp. n. Glabra, foliis ovatis acuminatis coriaceis, racemis petiolo vix longioribus paucifloris, filamentis laxis glabris anthera longioribus, capsula echinata.—Ab omnibus differt foliis coriaceis, 3- v. vix 4-pollicaribus, et antheris vix lineam longis. Frutex est orgyalis. Petala circa 4 lin. longa. Capsula aculeis longiusculis echinata.

Hab. Brazil. In the Serra de Araripe, near Brya Grande, in the province of Ceara, *Gardner*, n. 2396.

CARPOTROCHE, *Endl.*

A small genus, well distinguished from *Mayna* by the 6–7-merous gynœcium, with the styles united at the base only, and the globular fruit not muricate, but bearing numerous longitudial undulating wings or plaits. We have the following three species:—

1. C. BRASILIENSIS, *Endl.* Foliis oblongis obtusis acuminatisve glabris puberulisve, stipulis subulatis, pedicellis florem sericeo-pubescentem subæquantibus v. longioribus.—Folia 4–6-pollicaria. Petala interiora pollicaria.—*Mayna brasiliensis*, Raddi,—Zucc. Pl. Nov. fasc. ii. t. 5.

Hab. Brazil. On hills near Rio Janeiro, *Raddi, Gardner*, n. 247 and 5357; *Mart. Herb. Fl. Bras.* n. 96. In the province of Bahia, *Blanchet.*

2. C. GRANDIFLORA, *Spruce*, sp. n. Foliis amplis obovatis acuminatis molliter pubescentibus, stipulis bracteisque lanceolatis, pedicellis flore amplo dense sericeo brevioribus.—Folia 6–8-pollicaria. Petala obovata, 1¼–1½-poll. longa.

Hab. North Brazil. In the forest below the falls of San Gabriel, on the Rio Negro, *Spruce*, n. 2049, and in Caatingas and rocky woods on the Rio Uaupès, *R. Spruce*, n. 2812.

3. C. LONGIFOLIA. Foliis longe obovali-oblongis glabris, floribus parvis glabris dense cymoso-glomeratis.—Folia ultrapedalia. Flores rameales. Petala 3–5 lin. longa.—*Mayna longifolia,* Poepp. et Endl. Nov. Gen. et Sp. iii. p. 64. t. 271.

Hab. Eastern Peru and Western Brazil. At the confluence of the Teffé and the Solimoes, in primitive woods, *Poeppig*; in shady mountains near Tarapoto, *Spruce,* n. 4255.

DENDROSTYLIS, *Karst.*

With much general resemblance to *Mayna,* especially in the male flowers, this genus differs in the female (or occasionally hermaphrodite) flowers, which, with three placentas, have three distinct styles, each one bifid with laciniate branches, and the fruit is said to be indehiscent. It bears long soft spines, like some species of Mayna. To this genus belong the *Mayna denticulata* (Benth. in 'Hook. Journ. Bot.' iv. p. 115), from British Guiana; the *M. echinata* (Spruce, Pl. Exs. n. 4070 and 4499), from North Brazil; and a New Granada species from Purdie; but whether they be identical with or distinct from any of the five described by Karsten in the 'Linnæa' (xxviii. p. 431), I have not been able as yet satisfactorily to ascertain.

RYANIA, *Vahl.*

This genus, consisting of five or six species from tropical America, chiefly from Guiana, was formerly placed near to *Lætia,* but has since been removed to Passifloraceæ, probably on account of a cupular disk surrounding the ovary in some species. This disk is not, however, to be compared with the corona of Passifloreæ, which is always outside the stamens; nor yet with the disk of *Lunania,* for it is decidedly hypogynous; and the general arrangement of the perianth and stamens appears to me to be much more that of Bixaceæ than of Passifloreæ. The æstivation of the sepals, much imbricate as in *Lætiæ* and its allies, is, however, slightly different in the mode of imbrication; for, as in Cistineæ, two sepals are outside and the three inner ones contorted. There are no petals, the stamens are hypogynous, the anthers elongated, as in Oncobeæ, whilst all other characters bring the genus into Lætieæ.

LÆTIA, *Linn.*

This genus, like *Prockia,* had long been a receptacle for miscellaneous polyandrous plants with parietal placentas, but has latterly been better defined by Bennett, Clos, Grisebach and others, and is readily known by its very much imbricated, usually reflexed sepals without petals, short anthers, subulate entire style, and many-ovulated placentas. In two species the stamens are much fewer in number, and on the supposition that there were ten only, these plants were both referred by Poeppig to *Samyda*; and Grisebach, perceiving their discrepancy from the latter genus, proposes for their reception a new one under the name of *Casinga*, but without comparing them to *Lætia*. Sagot, however, has more correctly, in the sets of Cayenne plants he is distributing, labelled one of them as a new *Lætia*. I find in both of them the stamens varying in number from 10 to 15 or even more, and not uniseriate as in *Samyda* and its allies, nor yet so decidedly perigynous, although in all *Lætias* their insertion is somewhat ambiguous, between hypogynous and perigynous.

The fruit of the genus is described by Martius as an indehiscent berry, by Grisebach as having the pericarp drupaceous and dehiscent. I have seen it only in a few species, and then not always quite ripe. It appears, as in *Casearia*, to vary much in different species, in size as well as in succulence; in some it is decidedly 3-valved, at least at the top, in others it grows much larger and shows no sign of dehiscence. Two species have the bracts at the base of the pedicel united into a curious almost fleshy, truncate cup, which made me, in naming Spruce's plants, hesitate whether I should not consider them as a distinct genus; but I now find that a similar arrangement of the bracts is observable, though in a less degree, in several other Bixaceæ and Samydaceæ.

The following are the species hitherto published or known to me:—

* *Folia membranacea, sæpe punctata. Sepala corallina.*

1. L. THAMNIA, *Sw.*, *Griseb. Fl. Brit. W. Ind.* p. 20.

Hab. West Indies.

2. L. APETALA, *Jacq.*, *Mart. Nov. Gen. et Sp.* ii. p. 78. t. 165. Foliis ovato- v. obovato-oblongis obtusis, pedunculis subtrifloris, ovario glabro.

Hab. Tropical America.

To the localities given by Jacquin, Humboldt, and Martius, may be added, on the Rio Camude, in the province of Piauhy, Brazil, *Gardner*, n. 2312, udging from specimens in fruit only.

3. L. CORYMBULOSA, *R. Spruce*, *Pl. Exs.* n. 1599. Foliis oblongis ellipticisve acuminatis serrulatis membranaceis glabris, pedunculis 2–3-

chotome corymbosis, ovario glabro.—Habitus et folia *L. Thamniæ*; hæc vero angustiora, parce pellucido-punctata. Corymbi foliis 2–3-plo breviores, 8–20-flori. Flores albi, quam in *L. Thamnia* vix minores. Sepala vulgo 5, omnia petaloidea. Stylus stamina fere æquans, apice obtusus.

A small tree with the habit of a *Psidium*, gathered by Spruce in the gapò on the Solimoes in N. Brazil, in June 1851.

4?. L. FLORIBUNDA, *R. Spruce, Pl. Exs.* n. 1580.

This is probably a variety of the *L. corymbulosa*, with looser corymbs of smaller greenish flowers and broader leaves; but the specimens are scarcely sufficient to form a correct judgment. They were from a small tree in the gapò at Managuiri, near the confluence of the Solimoes and the Rio Negro, gathered by Spruce in June 1851.

** *Folia coriacea impunctata. Sepala firmiora. Stamina numerosa.*

5?. L. LUCIDA, *Tul. in Ann. Sc. Nat. Par.* ser. 3. vii. p. 286.

Hab. Columbia.

I have not seen this plant, but from Tulasne's detailed description it would appear to differ from the two following species in the absence of the cupular bracts; and still more so, as indeed from the rest of the genus, in its placentas bearing 2 ovules only, and in its sessile stigma.

6. L. CUPULATA, *Spruce, Pl. Exs.* n. 3200. Foliis oblongis ellipticisve coriaceis nitidis, floribus fasciculatis, pedicellis basi bractea cupulata fultis et ea plus duplo longioribus.—Arbor parva (25-pedalis), ramis paucis elongatis. Folia 4–6-pollicaria, breve petiolata. Cupulæ subsessiles, crassæ, fere 2 lin. longæ. Sepala 4–6, carnea, utrinque tomentella, reflexa, circa 3 lin. longa. Stamina numerosissima, atropurpurea. Ovarium tomentosum. Ovula in placentis 10–12. Stylus glaber, elongatus, stigmate breviter 3-fido. Fructus ovoideus, crasso-coriaceus, tomentosus, in valvulas 3 dehiscens. Semina non vidi.

Hab. In woods on the Casiquiare, above the mouth of the river Vasiva, in Venezuela; gathered by Spruce in December 1853.

7. L. CORIACEA, *R. Spruce, Pl. Exs.* n. 2730. Foliis oblongis acuminatis coriaceis nitidis, floribus fasciculatis, pedicellis basi bractea cupulata fultis et eam subæquantibus.—Folia quam in *L. cupulata* vulgo longiora, angustiora. Cupulæ floridæ in axillis arcte sessiles, paucæ, subglobosæ. Pedicelli brevissimi, tomentosi. Flores carnei, quam in *L. cupulata* minores; sepalis proportione latioribus. Fructus junior globosus, dense tomentosus. Cætera fere *L. cupulatæ*.

Hab. A small tree, seldom above 12 feet high, in the woods near Tomo, on the Guainia or Upper Rio Negro, in Venezuela, and near Panuré on the Rio Uaupès in N. Brazil*, *R. Spruce.*

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* In some former papers in this Journal, I had, by mistake, mentioned the Rio Uaupès as being in Venezuela instead of N. Brazil.

*** *Folia nitida, subcoriacea. Stamina* 10–15.

8. L. SUAVEOLENS (Samyda suaveolens, *Poepp. et Endl. Nov. Gen. et Sp.* iii. p. 66. t. 274. Casinga suaveolens, *Griseb. Erläut. Pfl. Trop. Amer.* p. 27).—Stamina sæpius 10, rarius 11–12.

Hab. Frequent on the Amazon, the Solimoes, the Rio Negro, and Casiquiare, *Poeppig, R. Spruce,* n. 1451, 2756 and 3451; also in Cayenne, *Martin.*

9. L. CASEARIOIDES, *Sagot, Pl. Gui. Exs.* n. 1137. (Samyda procera, *Poepp. et Endl. l. c.* p. 67, ex descr.)

Hab. On the Amazon, *Poeppig*; French Guiana, *Sagot.*

Differs slightly from *L. suaveolens* in the leaves rounded at the base, the shorter styles, and the stamens occasionally as many as 15, or even more. Grisebach has shown that the supposed new *Lætias* of A. Richards' 'Flora Cubensis' are identical with his *Zuelania lætioides,* a species of *Thiodia* among Samydaceæ.

APHLOIA, *Benn.*

Clos proposes removing this Madagascar genus to Capparideæ on account of the curved embryo, without, as he supposes, any albumen. In the seeds that I have examined, however, I certainly find albumen, although in less quantity than in other Bixaceæ, and the other characters are all much more those of Bixaceæ than of Capparideæ.

With regard to the Mascarene or Asiatic genera *Ludia* and *Erythrospermum,* and the African *Rawsonia, Dovyalis, Aberia,* and *Trimeria,* I have nothing to add to what has been said by Clos in the above-mentioned paper, or by Harvey in his 'Flora Capensis.'

AZARA, *Ruiz et Pav.*

Clos takes this genus as the type of a tribe, joining with it *Banara, Kuhlia,* and *Pineda,* and Bennett had already suggested that *Pineda* might not be distinct from *Azara.* The calyx of the latter is, however, not valvate as in *Banara,* nor has it the sepaline petals of that genus. In most species the sepals are small, and long before the expansion of the flower no longer meet at the edges, but when they do, they slightly overlap. The stamens are also hypogynous, or but slightly and much less perigynous than in *Banara* (in which we include *Kuhlia* and *Pineda*). Altogether, *Azara* appears to me to be nearly allied to *Scolopia* in habit as well as in character, differing chiefly in the want of petals and of the appendage to the connectivum of the anthers.

We have no new species to add to the genus; and one of those already published (*A. microphylla,* Hook. fil.) is very anomalous, having only 5 stamens alternating with the sepals, and as many glands opposite the sepals as in Homalieæ; but the habit and other characters are so much those of *Azara*, that we feel scarcely justified in proposing it as a distinct genus, unless the differences be continued through other species.

SCOLOPIA, *Schreb.*

Clos has shown sufficient reason for adopting Schreber's earlier name of *Scolopia* in lieu of *Phoberos* of Loureiro, which has been more frequently in use. The genus is well characterized, and we have probably about 15 species in our herbaria, including several unpublished Australian ones; but several of those enumerated by Clos require revision. The genus is unrepresented in America.

FLACOURTIA, *Lhér.*, and XYLOSMA, *Forst.*

The Asiatic *Flacourtias*, the American *Flacourtias* or *Hisingeras*, and the Pacific *Xylosmas*, are all so closely allied that no character whatever has been pointed out in the male individuals by which they can be generically separated. In the females, however, the true Asiatic *Flacourtias* have, in the structure of their completely several-celled ovary, so anomalous in the Order, and in the bony endocarp separating the ripe seeds, too positive a distinction to be neglected, and must now be admitted as a well-established genus. Clos thought, also, that he found in the styles and stigmas sufficient to separate the *Hisingeras* or American *Flacourtias* of previous authors from *Xylosma*. Asa Gray has, however, shown that this character completely breaks down, especially in the Japanese species; and Grisebach has followed his example, in referring all the *Hisingeras* to *Xylosma*. In further confirmation of the correctness of this view, we may state that the *Flacourtia chinensis*, Clos, and *Hisingera japonica*, Sieb. and Zucc., appear to be specifically identical. Considering the two genera as thus limited, 18 species of *Flacourtia* and 27 of *Xylosma* (including *Hisingera*) have been enumerated by Clos. Grisebach reduces, however, to *Xylosma nitidum* at least six of Clos's *Hisingeras*. It is possible that a careful monographist might not go quite so far in this amalgamation; yet as far as we can judge from a hasty inspection, we think that the fairest estimate of the number of species of the two genera more or less known or deposited in our herbaria, is about 12 for *Flacourtia* and about 25 for *Xylosma*.

BENNETTIA, *Miq.*

We may hope that this genus, dedicated to our distinguished friend who so long devoted to us his valuable services as Secretary, may meet with a better fate than those previously named in his honour (*Bennettia*, S. W. Gray, is *Saussurea*, DC., and *Bennettia*, R. Br., proves to be *Galearia*, Blume). The new genus is founded by Miquel on a single Javanese species, and is allied to *Flacourtia* and *Xylosma*; and although the fruit is as yet imperfectly known, it may be maintained as distinct, on account of the 3-merous calyx, and the peculiar stipitate glands (perhaps staminodia) which cover the disk surrounding the ovary in the female flowers; for these characters are accompanied by a different habit, arising chiefly from the paniculate inflorescence.

The SAMYDACEÆ, as we have above proposed to extend them, being composed of genera usually distributed into three different orders, will naturally be divided into as many tribes, which we may call *Casearieæ*, *Banareæ*, and *Homalieæ*. To these it is probable that *Turnereæ* may be added as a fourth tribe; but the limits of the Order, on the side of Calycifloræ, cannot be determined until the whole of the parietose Orders of that class shall have been worked up and compared with the exceptionally parietose genera in Saxifragaceæ and other Orders where the placentation is normally axile. As far as concerns the genera which have more or less connexion with Bixaceæ, and which we have hitherto examined or studied, I should include the following among Samydaceæ:—

Tribus I. CASEARIEÆ. Calyx liber, 4–5-merus. Petala 0. Stamina 6–30, simplici serie tubo calycis inserta, interjectis sæpe in eadem serie squamis seu staminodiis totidem.

* *Squamæ seu staminodia staminibus interjecta, libera v. in cupulam connata.*

Genera:—1. Thiodia, *Benn.* (Zuelania, *Rich.*) 2. Casearia, *Linn.* (Valentinia, *Sw.* Guidonia, *Griseb.*) 3. Osmelia, *Thw.* (Stachycrater, *Turcz.*) 4. Lunania, *Hook.* 5. Euceræa, *Mart.*

** *Squamæ seu staminodia* 0.

Genera:—6. Sadymia, *Griseb.* 7. Samyda, *Linn.*

Tribus II. BANAREÆ. Calyx liber, 4–5-merus. Petala tot quot sepala. Stamina numerosa pluriseriata, disco perigyno inserta.

Genus:—8. Banara, *Aubl.* (Kuhlia, *H. P. et K.* Pineda, *R. et P.* Christannia, *Presl.* Ascra, *Schott.*)

Tribus III. HOMALIEÆ. Calyx liber v. basi ovario adnatus, 4–15-merus. Petala tot quot sepala v. rarius numero dupla. Stamina petalis numero æqualia v. plura, singulatim v. fasciculatim iis opposita, cum glandulis pulvinatis sepalis oppositis alternantia.

** Ovarium superum.*

Genera:—9. Calantica, *Tul.* 10. Bivinia, *Tul.* 11. Dissomeria, *Benth.*

*** Ovarium semi-inferum.*

Genera:—12. Homalium, *Jacq.* (Blackwellia, *Comm.*) 13. Byrsanthus, *Guillem.*

With the exception of *Osmelia*, *Lunania*, and *Banara*, I have, for the present, but few remarks to offer on these genera. For *Thiodia*, *Sadymia*, and *Samyda*, I may refer to Grisebach's 'Erläuterungen' above mentioned. The large genus *Casearia* is much in need of a careful monographist, for some of the common species have been repeated by various authors under several different names. I see no reason for modifying the five sections into which I proposed to divide it in the 4th vol. of 'Hooker's Journal of Botany.' Grisebach has indeed well identified *Valentinia*, Sw., with the section *Hexanthera*, Endl., and my *Casearia brevipes* with *Lætia guidonia*, Sw., both of which he proposes to establish as distinct monotypic genera; but I can scarcely concur in the reasons which he gives. In *Valentinia* there appears to be nothing but the prickly-toothed leaves to rely upon. In *Guidonia* the scales or staminodia are very short, and slightly united outside the filaments, so that the stamens appear to be inserted within the notches of a short crenulated tube; yet it appears to me that this cannot be considered as a structural difference, nor as the character of a group of species, but merely as a difference in degree, exemplified in a single one which has otherwise the habit and characters of the *Iroucanas*.

Osmelia, Thw., from Ceylon, has the perianth, stamens and ovary of *Casearia*, but the styles are short and free from the base; and this character being accompanied by a very marked difference in inflorescence, and confirmed in two other species from the Philippine Islands, may be considered as amply sufficient for establishing a generic group. One of the latter species has been published by Turczaninow under the name of *Stachycrater*, too nearly after the appearance of the first part of Thwaites' 'Enumeration of Ceylon Plants' for him to have been aware of the

Osmelia being there described; yet the latter name has undoubtedly the right of priority. The three species may be distinguished as follows:—

1. O. PHILIPPINENSIS. Foliis (4–6-pollicaribus) longiuscule petiolatis basi acutatis 3-nerviis, racemis gracilibus axillaribus subramosis, floribus 4-fidis 8-antheris.—*Stachycrater philippensis*, Turczan. Bull. Mosq. 1859.

Hab. Philippine Islands, *Cuming*, n. 1685.

2. O. CONFERTA. Foliis (4–5-pollicaribus) brevius petiolatis basi rotundatis penninerviis v. irregulariter 3-nerviis, racemis axillaribus subramosis folio brevioribus, floribus 4-fidis 10-antheris.—Flores quam in præcedente majores confertiores. Sepala linea sublongiora, late orbiculata.

Hab. Philippine Islands, *Cuming*, n. 1741.

I opened six flowers, in all of which I found the 10 stamens and staminodia, with only 4 sepals, as in some Casearias.

3. O. GARDNERI, *Thw. Enum. Pl. Zeyl.* p. 20. Foliis (2–4-pollicaribus) basi acutatis penniveniis, racemis elongatis in panicula terminali divaricatis, floribus 5-fidis 10-antheris.

Hab. Ceylon, *Gardner*, n. 193, *Thwaites*, n. 1246.

LUNANIA, *Hook.*

Placed hitherto among Bixaceæ, this genus offered several remarkable anomalies, especially in the definite stamens inserted on a cupular disk, which appeared to have nothing analogous in the Order. The additional species, however, now known fully explain the nature of this disk, showing that it is formed of the union of the scales or staminodia of Samydeæ, and that *Lunania* is in fact closely allied to *Osmelia*, of which it has also the habit and inflorescence. The chief generic distinction consists in the calyx, which, as in some Pangieæ, is quite entire and globular before flowering, and then divides into 2, or rarely 3, broad concave valvate sepals. The union of the staminodia with the base of the stamens in a cupular or shortly tubular disk, occurs also, as already observed, in *Casearia guidonia* (*C. brevipes*, Benth.; *Guidonia spinescens*, Griseb.); but in that species the stamens appear to be inserted slightly within its crenatures, whilst in *Lunania* they are rather external. In *Lunania divaricata* the disk-lobes and stamens are almost as much in a single series as in *Osmelia*.

The following are the species of *Lunania* now known:—

1. L. Grayi, *Griseb. Erläut. Pfl. Trop.* p. 26. Foliis a basi 3-nerviis obtusis (1½–3-pollicaribus) basi subacutis, pedicellis plerisque flore longioribus, staminibus sæpius 6, disco truncato.

Hab. Cuba, *Linden*, n. 2130; *Wright*, n. 464 and 1110.

Linden's plant was, by mistake, referred by Grisebach, in the 'Flora of the British West Indies,' to the *L. racemosa*, but he had not yet, at that time, distinguished the two species.

2. L. racemosa, *Hook. Lond. Journ. Bot.* iii. p. 317. t. 11 et 12. Foliis 3–5-plinerviis acuminatis (3–5-pollicaribus) basi truncatis cordatisve, pedicellis flore raro longioribus, staminibus sæpius 6, disci dentibus acutis glabris.

Hab. Jamaica, *Purdie*, *Wilson*.

3. L. parviflora, *Spruce*, sp. n. Foliis a basi 3–5-nerviis acuminatis (4–5-pollicaribus) basi obtusis rotundatisve, pedicellis brevissimis, staminibus sæpius 10, disci lobis obtusis ciliatis.—Arbor tenuis, 18-pedalis, ramulis subpendulis, tota glabra. Folia abrupte acuminata, integerrima, fere *L. racemosæ*, nervis tamen lateralibus basi a costa distinctis. Racemi longi, lineares. Flores quam in *L. racemosa* multo minores et fere sessiles. Perianthium per anthesin in lobos 2, rarius 3, primum reflexos, mox circumscisse deciduos divisum. Stamina fere semper 10, filamentis brevissimis; antheræ ut in cæteris speciebus oblongæ in flore modo apertæ arcte conniventes et stricte extrorsæ. Discus crassiusculus breviter cupulatus, lobis brevibus latis obtusis ciliolatis. Stylus brevis, conicus, obtusus, demum sæpe tripartitus fere *Osmeliæ*.

Hab. In young woods on the Yurimaguas, province of Maynas, Western Brazil, *R. Spruce*, n. 3909.

4. L. divaricata, sp. n. Foliis a basi 3–5-nerviis acuminatis (2–3-pollicaribus) coriaceis basi acutiusculis, pedicellis brevissimis, staminibus 6–8 cum disci segmentis truncatis alternantibus.—Ramuli in specimine breves, valde divaricati, ad nodos incrassati. Folia quoad formam iis *L. parvifloræ* subsimilia sed multo minora, magis coriacea, in sicco pallida et basi plus minus angustata. Petioli subsemipollicares, apice incrassati et inflexi. Racemi minute tomentelli, tenues, 2–3-pollicares, per 3–5 in paniculas valde divaricatas dispositi. Flores fere sessiles, quam in *L. parviflora* adhuc minores. Calyx in sepala 2 reflexa rumpens. Stamina sæpius 6, sed etiam 7 et 8 enumeravi. Discus fere ad basin divisus in segmenta totidem orbiculato-truncata.

Hab. Cuba, *Wright*, n. 1563.

Banara, *Aubl.*

It is now admitted that *Ascra*, Schott, and *Boca*, Vell., are generically the same as *Banara*, and Clos has brought in close juxtaposition *Kuhlia*, H. B. et K., and *Pineda*, Ruiz and Pav. (*Christannia*, Presl). He might have gone further and absolutely united

them; for the supposed distinctive characters have only arisen from differences in the manner of describing them, not in the characters themselves. One, indeed, of the original *Kuhlias* may not be specifically distinct from Aublet's *Banara*, and other species have been referred by one author to *Kuhlia*, and by another to *Banara*, with equal correctness. I cannot, however, by any means concur with Grisebach in uniting *Banara* with *Prockia*. The latter genus differs essentially in its hypogynous stamens and completely several-celled ovary, and I have no hesitation in following Clos, who refers it to Tiliaceæ. I have had occasion to revert to it in some notes on the latter Order which precede the present paper.

I am unable at present to give a good diagnostic synopsis of the genus, for want of authentic specimens of some of the published species. When better known, it is probable that the 15 comprised in the following enumeration may be reduced to 14, 13, or perhaps to 12 only.

§ 1. *Flores paniculati. Sepala irregulariter valvata, sæpe jam ante anthesin aperta petala ostendentia v. cum iis subimbricata.*

1. B. PARVIFLORA. (Kuhlia parviflora, *A. Gray, Bot. Amer. Expl. Exped.* i. p. 73.)

Hab. Organ Mountains near Rio Janeiro, *American Exploring Expedition.*

2. B. TOMENTOSA, *Clos in Ann. Sc. Nat. Par.* ser. 4, viii. p. 240.

Hab. Brazil, province of Rio Grande do Sul, *Herb. Par.*, quoted by Clos.

The above two species, of neither of which have I seen authentic specimens, must, from their descriptions, be closely allied to each other, if not identical. Some specimens of Tweedie's in the Hookerian herbarium, from Rio Grande do Sul, may be the same as Clos's plant, but they are quite glabrous, even on the calyx. The flowers are the smallest in the genus.

3. B. ULMIFOLIA. (Kuhlia ulmifolia, *H. B. et K. Nov. Gen. et Sp.* vii. p. 237. t. 653.)

Hab. New Grenada, in the Andes of Popayan, *Humboldt & Bonpland*; in the province of Antioquia, *Triana.*

The flowers, rather larger than in Tweedie's plant, are still much smaller than in all the following species.

4. B. LAXIFLORA, sp. n. Glabra, foliis petiolatis elliptico- v. obovali-oblongis acuminatis basi angustatis et trinerviis, paniculis laxe divaricatis folia subæquantibus.—Arbor tenuis, 18-pedalis, ramis patulis. Folia 4–7-poll. longa, leviter sinuato-dentata, basi sæpius acuta, mem-

branacea, impunctata; petiolo 4–8 lin. longo. Paniculæ axillares; ramis bis, ter, quaterve 3–4-nis gracilibus, divaricatis. Pedicelli graciles, calyce longiores. Sepala sæpius 3, ovata, acuta, 1 lin. longa, nunc in alabastro petala valvatim includentia, nunc sæpius jam ante anthesin plus minus aperta et cum petalis imbricata. Petala sepalis æquilonga, obtusa, imbricata, extus puberula, cum sepalis per anthesin reflexa. Stamina perigyna, ultra 30; filamentis filiformibus, flexuosis; antheris subglobosis. Ovarium glabrum, basi attenuatum; placentæ 2 (v. 3?), valde prominentes, infra medium septum completum formantes, superne ad axin liberæ. Stylus brevis, integer. Bacca globosa.

Hab. Western Brazil and Eastern Peru, frequent on the banks of the Marañon and Pastasa, *R. Spruce*, n. 4964.

5. B. PUBESCENS, *Spruce*, sp. n. Molliter pubescenti-hirta, foliis brevissime petiolatis ovali-oblongis acuminatis serratis basi rotundatis subcordatisve penninerviis paniculis axillaribus folio brevioribus.—Arbor 40-pedalis, dense ramosa ligno duro. Folia 4–5-pollicaria, serraturis glanduliferis, sæpe obliqua, supra demum asperula, subtus molliter pubescentia; glandula utrinque ad petiolum brevem v. ad basin laminæ. Paniculæ axillares 1–3-pollicares, laxiuscule trichotomæ v. sæpius irregulariter ramosæ, pubescentes. Sepala 2 lin. longa, in alabastro plus minus aperta, v. rarius hinc inde valvatim clausa. Petala paulo majora, imbricata, extus puberula, per anthesin patentia at non reflexa. Stamina fere 100, perigyna; filamentis filiformibus, antheris subglobosis. Ovarii placentæ in flore examinato 6, fere ad medium cavitatis prominentes; ovulis parvis, numerosis, pluriseriatis. Stylus breviter subulatus, integer.

Hab. Eastern Peru (or Ecuador?), in woods at Pallatanga, *R. Spruce*, n. 5528.

The flowers, according to Spruce, have the scent of our common lime tree.

§ 2. *Flores pyramidato-paniculatæ. Sepala strictius valvata, petala in alabastro includentia.*

6. B. GLAUCA (Kuhlia glauca, *H. B. et K., Nov. Gen. et Sp.* vii. p. 236. t. 652).

Hab. New Grenada, *Humboldt & Bonpland.*

I have seen no authentic specimen of this species, but from Kunth's figure and description it must be very closely allied to, if not identical with, the *B. guianensis.*

7. B. GUIANENSIS, *Aubl., Clos in Ann. Sc. Nat.* ser. 4, viii. p. 259, with the synonyms adduced. (*B. mollis*, Tul., Clos, *l. c.* with the synonyms. *Trilix glandulosus*, Griseb. Fl. Brit. W. Ind. p. 22.)

Hab. Widely spread over tropical America. We have specimens from

Panama, Trinidad, Guiana, Surinam, *Hostmann*, n. 495; Cayenne, New Grenada, Tropical Brazil, *Gardner*, n. 1451; Peru, *Ruiz & Pavon*, &c.

Spruce's n. 4894, from Tarapoto, may be a variety of this species, but it is remarkable for the large panicles of flowers much smaller than usual.

8. B. VELLOSII, *Gardner in Hook. Lond. Journ. Bot.* ii. p. 331. (Boca serrata, *Vell. Fl. Flum.* v. t. 113.)

Hab. Brazil, near Rio Janeiro, *Gardner*, n. 310.

I have considerable doubts whether this is more than a variety of *B. guianensis.*

9. B. IBAGUENSIS, *Tul. in Ann. Sc. Nat. Par.* ser. 3, vii. p. 290.

Hab. Near Ibague in New Grenada, *Goudot.*

United by Grisebach with *B. guianensis,* it appears to me to differ in several points. It is readily recognized by its sessile flowers.

10. B. BRASILIENSIS (Kuhlia brasiliensis, *A. Gray, Bot. Amer. Exp. Exped.* i. p. 73. Ascra brasiliensis, *Schott in Spreng. Syst. Cur. Post.* p. 407).

Hab. Brazil, province of Rio Janeiro, *Schott.*

This is referred by Clos to the *B. Vellosii*; but it appears to be quite distinct in the more coriaceous leaves narrowed into a longer petiole, the smaller flowers, &c.

11. B. MEXICANA, *A. Gray, Pl. Ervendb.*

Hab. Wurtenberg, near Tantoyuca, province of Huasteco, Mexico, *L. C. Ervendberg.*

This species is fully described by Asa Gray in an enumeration of Ervendberg's plants, now in the press.

12. B. NITIDA, *Spruce,* sp. n. Foliis ovali-oblongis acuminatis glabris nitidis penninerviis, panicula ramosa tenuiter canescente.—Arbor patula, 40-pedalis. Folia 4–6-pollicaria, obtuse et remote dentata, basi obliqua, supra ad petiolum brevem glandula scutellata aucta. Panicula laxa. Flores pedicellati, flavo-virides. Petala et sepala 1 lin. longa. Capsula globosa, glabra, indehiscens, 4 lin. diametro.

Hab. Along streams near Tarapoto, in Eastern Peru, *R. Spruce,* n. 4512.

§ 3. *Flores ad apices ramorum v. rarius ad axillas breviter simpliciterque racemosi v. fasciculati.*

13. B. GRANDIFLORA, *Spruce,* sp. n. Foliis ovali-ellipticis 3-nerviis glabris, floribus in spica terminali paucis dissitis sessilibus.—Arbor parva, vage ramosa, 20-pedalis. Folia 4–6-pollicaria, remote callosodentata, subcoriacea, usque ad apicem trinervia; glandulis nullis nisi ad dentes marginales. Spica interrupta, 2–3-pollicaris. Flores pauci quam in cæteris speciebus majores. Sepala valvata et petala imbri-

cata persistentia, incano-tomentosa, in fructu conniventia, 5 lin. longa. Bacca sicca, placentis 5 in cavitate valde prominentibus.

Hab. Among rocks along streams near Tarapoto, in Eastern Peru, *R. Spruce*, n. 4897.

14. B. INCANA. Foliis (subpollicaribus) oblongis denticulatis obtusiusculis penninerviis utrinque incanis, floribus longiuscule pedicellatis in racemo abbreviato paucis.—*Pineda incana*, Ruiz et Pav. Prod. Fl. Per. et Chil. p. 76. *Christannia salicifolia*, Presl Rel. Hænk. ii. p. 91. t. 67.

Hab. Peru, *Ruiz* and *Pavon*; in the mountains of Huanuco, *Hænke*; near San Rafael, *Matthews*, n. 891.

Var.? *Jamesoni.* Foliis crassioribus glabris siccitate nigricantibus, venis præter costam inconspicuis, pedicellis parum brevioribus. Foliorum forma et flores incano-tomentosi omnino *B. incanæ*.

Hab. Ecuador, near Oña, and between Cuenca and Loxa, *Jameson*.

I have only seen two small specimens, and cannot therefore judge of the constancy of the characters derived from the leaves. Jameson describes it as a small tree. *B. incana* is said to be a shrub.

15. B. DIOICA, sp. n. Foliis elliptico-oblongis lanceolatisve acuminatis remote dentatis 3-nerviis subcoriaceis glabris v. subtus pubescentibus, floribus dioicis in racemo abbreviato 2–4.—Folia 2–3-pollicaria. Racemi folio breviores, terminales, tomentosi, rhachi brevissimo; pedicellis 3–4 lin. longis. Sepala 3, valvata, ovata, 2 lin. longa, tomentosa. Petala majora, imbricata, extus glabriuscula, intus sericeo-tomentosa. Stamina numerosissima. Stylus simplex. Placentæ 3.

Hab. Near Vera Cruz, Mexico, *Linden*, n. 31; *Galeotti*, n. 7019.

16. B. DOMINGENSIS, sp. n. Foliis ovatis obtusis subtrinerviis coriaceis subtus scabro-puberulis, pedicellis in racemo brevissimo paucis, floribus hermaphroditis.—Folia 2–3-pollicaria, sæpius late ovata, remote glanduloso-denticulata; petiolo brevi. Pedicelli ad axillas foliorum vetustiorum v. ad nodos defloratos 2–5-ni, singuli 3–5 lin. longi, uniflori, puberuli. Sepala 3–4, late ovata, valvata, coriacea, extus tomentella. Petala totidem paulo tenuiora et longiora, imbricata, extus tomentella et cum sepalis persistentia. Stylus stamina æquans. Placentæ 3, ovulis pluriseriatis.

Hab. St. Domingo, *Schomburgk*, n. 79.

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ERRATA.

For *Piplostylis*, read throughout *Piptostylis.*
For *Casimaroa*, read throughout *Casimiroa.*

THE END.

Printed by TAYLOR and FRANCIS, Red Lion Court, Fleet Street.